



# AIR FORCE ROADMAP 2006 › 2025

U.S. AIR FORCE

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# Roadmap

A capability-based force  
structure plan through 2025

## Executive Summary

This Air Force Roadmap is a capability-based force structure plan that conveys the planned recapitalization and modernization of the Air Force through 2025. It articulates the strategic foundations of the force and the distinctive air and space power capabilities this force structure provides. The end result is a powerful force structure that will dominate adversaries in air, space, and cyberspace across the spectrum of conflict, now through 2025.

There are several strategic foundations for the Air Force future force structure. First, it directly supports national strategic objectives defined in the National Security Strategy of the United States of America, National Defense Strategy of the United States of America, and other planning guidance, and enables effects-based operations as directed by the 2006 Quadrennial Defense Review. Reflecting capability requirements for the future as described in the Air Force Concepts of Operations, this force structure will provide the critical and enabling Air Force capabilities needed to achieve desired joint warfighting effects across the range of military operations and throughout the strategic environment.

Second, the highest priority of the resulting force structure is protecting the United States from direct attack. To accomplish this, the Air Force contributes toward creating three desired effects: preventing, protecting against, and responding to the full spectrum of domestic threats and incidents.

Third, to support United States national security, the Air Force must transform to provide joint force commanders with the most effective solutions to conduct a broad spectrum of joint operations. The Air Force is pursuing an aggressive transformation strategy to include enhancing joint and coalition warfare; pursuing innovation; shifting to capability and effects-based planning; and embracing information age thinking.

Fourth, while weapon systems are an integral part of the Air Force, the heart of Air Force combat capability resides with Airmen. Only through an unwavering commitment to effectively recruiting and efficiently training and presenting combat-ready Airmen to combatant commanders, where and when they're needed, can the Air Force remain the world's pre-eminent air and space power.

Fifth, the future Air Force depends heavily on efficient organizational structures embodied in Total Force Integration initiatives. This will allow the Air Force to most effectively and efficiently combine Active, Guard, and Reserve forces to best provide air and space power combat capability to joint force commanders.

Sixth, the Air Force's force structure addresses the critical need to recapitalize its rapidly aging aircraft. To ensure the future Air Force will continue to provide air, space, and information dominance across the range of military operations, some tough choices must be made today. To recapitalize the aging Air Force inventory, less capable legacy platforms must be divested and modern, survivable, persistent, precision systems procured, which will enable battlespace dominance and effects-based operations for years to come.

For presentation, the Air Force Roadmap organizes current and future force structure under six distinctive capabilities: air and space superiority, information superiority, global attack, precision engagement, rapid global mobility, and agile combat support. Clearly, individual weapon systems operate across multiple capabilities; however, in this Roadmap, weapon systems are generally depicted in a given section based on the capability predominantly provided by that weapon system.

Additionally, the Air Force provides specialized air power through Air Force Special Operations Command. While these specialized capabilities could be described using these same six distinctive capabilities, they are included as a separate section to emphasize the unique nature of special operations.

Air Force  
Distinctive Capabilities  
Air and Space Superiority  
Information Superiority  
Global Attack  
Rapid Global Mobility  
Precision Engagement  
Agile Combat Support



# Grounded in the national and military strategic planning guidance and postured for the future security environment

The first distinctive capability, **air and space superiority**, is the ability to control what moves through air and space to ensure freedom of action. It provides freedom to attack as well as freedom from attack. Success in air, land, sea, and space operations depends upon air and space superiority. Air superiority assets include the F-22A, F-15, and certain model F-16 weapon systems, while space superiority systems include counterspace systems.

The next distinctive capability, **information superiority**, is the ability to collect, control, exploit, and defend information while denying an adversary the ability to do the same. It is comprised of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) and Information Operations. C4ISR is organized into the domains of space, air, ground, and cyberspace. Space domain C4ISR systems include Satellite Communications; Positioning, Navigation, and Timing; and Surveillance and Reconnaissance. Systems in the air domain provide Command and Control and Intelligence, Surveillance and Reconnaissance capabilities to include the E-3, E-8, U-2, RC-135, MQ-1 and RQ-4. The ground domain consists of Air and Space Operations Centers, Distributed Common Ground Stations, Battlefield Control System, Space Command and Control, and Ground Surveillance and Reconnaissance systems. Cyberspace is the electronic medium of net-centric operations, communications systems, and computers, in which horizontal integration and online communication takes place. Information operations are the integrated employment of the capabilities of influence operations, electronic warfare operations, and network warfare operations to influence, disrupt, corrupt, or usurp adversarial human and automated decision-making while protecting one's own.

**Global attack** is the ability to engage adversary targets rapidly and persistently with a wide range of munitions anywhere and at anytime to hold any adversary at risk. Global Attack force structure consists of the existing F-22A, F-16, A-10, F-15E, MQ-9, F-117, B-52, B-1, B-2, and Minuteman III weapon systems. Recapitalization planned by the F-35A Joint Strike Fighter and New Bomber, and modernization of the Minuteman III arsenal will significantly improve this capability through 2025 and beyond.

The **rapid global mobility** capability uses a combination of airlift, air refueling, and spacelift assets to provide the United States the strategic agility to deploy, employ, and sustain United States military power anywhere with speed and tempo that adversaries cannot match. The Air Force continues to acquire C-17s and C-130Js and operate C-5s to provide airlift capability, and plans to develop future airlift systems. The KC-135 and KC-10 provide air refueling capability, which the Air Force plans to recapitalize with the future KC-X. The Evolved Expendable Launch Vehicle will provide spacelift capability through 2025.

**Precision engagement** is the ability to command, control, and employ forces to cause specific strategic, operational, or tactical effects. To achieve many of the desired effects of precision engagement, the Air Force employs precision and near precision guided munitions, which this section covers.

**Agile combat support** (ACS) is the Air Force distinctive capability to create, protect, and sustain air and space forces across the full range of military operations. It is the foundational and crosscutting Air Force system of support that enables Air Force operational concepts. Because ACS covers the entire spectrum of combat support for the Air Force, the roadmap can only highlight a few ACS future vectors in the areas of readying, sustaining, and employing the force.

Though not a distinctive capability per se, **specialized air power** is comprised of special operations forces and combat search and rescue forces. These forces provide Air Force special operations and combat search and rescue capabilities for worldwide deployment and assignment to regional unified commands. Air Force Special Operations Command provides special operations strike; Intelligence, Surveillance and Reconnaissance (ISR) and information operations; and mobility forces. Air Combat Command provides combat search and rescue units.

The systems, described in these six distinctive capabilities and specialized air power, comprise the force structure of the Air Force. It is grounded in national and military strategic planning guidance, and postured for the future security environment. With Airmen at the center, operating, maintaining, and supporting recapitalized, highly capable weapon systems across the Air Force distinctive capabilities, it is the right Air Force for the nation's future.

## Air Force Mission

To deliver sovereign options for the defense of the United States of America and its global interests – to fly and fight in Air, Space, and Cyberspace

### Introduction

The mission of the Air Force is “to deliver sovereign options for the defense of the United States of America and its global interests – to fly and fight in Air, Space, and Cyberspace.” The Air Force accomplishes this mission by providing rapid strike, global mobility, and persistent C4ISR to joint force commanders every day. These are the core tasks of the Air Force. To accomplish these tasks, the Air Force focuses on providing six distinctive capabilities: air and space superiority, information superiority, global attack, precision engagement, rapid global mobility, and agile combat support. This Air Force Roadmap describes the planned force structure of the Air Force through the year 2025, organized around these six capabilities with specialized air power highlighted separately to emphasize its unique nature.

However, before describing the detailed force structure, this foundation section first provides the context for that force structure. It reviews the strategic guidance that shapes the force structure and guides homeland defense; the transformation efforts vital to future effectiveness; the Airmen and organizational structures needed to operate, maintain, and support this force structure; and the issues integral to its recapitalization.

### Strategic Guidance

The fundamental requirements for the force structure of the Air Force reside in the national strategic guidance documents, which describe the objectives the United States Armed Forces are expected to achieve; the current and future environment in which they are expected to operate; and the unique capabilities that the Air Force contributes to joint warfighting. While these documents cover many facets of strategy, there are key aspects of each that directly relate to the force structure of the Air Force.

The National Security Strategy (NSS) of the United States of America is the foundation strategy upon which all other defense-related strategy and guidance are developed. The NSS clearly delineates the military as a national instrument of power in the coordinated effort to defeat terrorism worldwide. The NSS is founded upon two pillars: The first pillar is promoting freedom, justice, and human dignity. The second pillar is confronting the challenges of our time by leading a growing community of democracies.

The National Defense Strategy (NDS) of the United States of America builds on the broad guidance in the NSS by characterizing the challenges of the uncertain strategic environment in which the military must be prepared to function and prevail:

**Irregular** challenges from those employing unconventional methods to counter the traditional advantages of stronger opponents

**Traditional** challenges posed by states employing recognized military capabilities and forces in well-understood forms of military competition and conflict

**Catastrophic** challenges involving the acquisition, possession, and use of weapons of mass destruction (WMD) or methods producing WMD-like effects

**Disruptive** challenges from adversaries who develop and use breakthrough technologies to negate current United States advantages in key operational domains

Without question, the United States military in general, and the Air Force in particular, currently predominate in traditional forms of conflict. Potential adversaries recognize this fact and increasingly seek to challenge the United States through non-traditional capabilities and methods. To deal with this new/future security environment, the Air Force must be prepared to face a wide range of future contingencies across the spectrum of conflict.

The 2006 Quadrennial Defense Review (QDR) further develops this strategic guidance by defining the force planning construct of the United States military as a summation of homeland defense; war on terror and irregular operations; and conventional campaigns.

Force Planning Construct

Defend the Homeland
<b>Steady:</b> Detect, deter, and if necessary, defeat external threats to the U.S. homeland Enable partners to contribute to U.S. national security
<b>Surge:</b> Contribute to the nation’s response to WMD attacks or a catastrophic event Raise the level of defense responsiveness in all domains if directed

Prevail in the War on Terror and Conduct Irregular Operations
<b>Steady:</b> Deter and defend against external transnational terrorist attacks  Enable partners through integrated security cooperation programs  Conduct multiple, globally distributed irregular operations of varying duration  Employ general purpose forces continuously to: Interact with allies Build partner capability Conduct long-duration counter insurgency operations Deter aggressors through forward presence
<b>Surge:</b> Conduct a large-scale, potentially long-duration irregular warfare campaign

Conduct and Win Conventional Campaigns
<b>Steady:</b> Deter inter-state coercion or aggression through forward deployed forces  Enable partners through theater security cooperation Conduct presence missions
<b>Surge:</b> Wage two nearly simultaneous conventional campaigns (or one conventional campaign if engaged in a large-scale, long-duration irregular campaign)  Selectively reinforce deterrence against opportunistic acts of aggression  Be prepared in one of the two campaigns to: Remove a hostile regime Destroy its military capacity Set conditions for the transition to, or restoration of, civil society

The QDR further focuses on four priorities:

- Defeating terrorist networks
- Defending the homeland in depth
- Shaping the choices of countries at strategic crossroads
- Preventing hostile states and non-state actors from acquiring or using WMD

The National Military Strategy (NMS) derives objectives, missions, and capability requirements from the NSS and NDS and conveys three objectives:


- Protect the United States
- Prevent conflict and surprise attack
- Prevail against adversaries

To achieve these objectives, the Capstone Concept on Joint Operations outlines a series of Joint Operating Concepts for how the Joint Force will operate in the future. The hierarchy of joint concepts also includes Joint Functional Concepts and Joint Integrating Concepts. The detailed nature of these joint concepts is beyond the scope of this Air Force Roadmap, but the method the Air Force uses to synchronize with them is the Air Force Capabilities-Based Planning (AF CBP) process.

The AF CBP process rests on the conceptual foundation of the Air Force Concepts of Operations (CONOPS). The AF CONOPS describe key Air Force mission areas and/or functional areas for enabling desired joint warfighting effects in accordance with national, joint, and service guidance. They articulate the capabilities required to achieve those effects in systems-agnostic terms. In short, they describe how air and space power capabilities should be employed for effect without describing the specific weapon systems associated with a set of given or anticipated capabilities. In turn, these capabilities drive requirements, which drive the force structure. The current Air Force CONOPS are:

- Agile Combat Support
- Global Mobility
- Global Persistent Attack
- Global Strike
- Homeland Security
- Nuclear Response
- Space and C4ISR

Though capability-based, the Air Force Roadmap does describe specific weapon systems and other resources. Thus, it is organized under the six distinctive Air Force capabilities: air and space superiority, information superiority, global attack, precision engagement, rapid global mobility, and agile combat support. Additionally, specialized air power is included as a separate capability to highlight its unique nature. While many weapon systems function in more than one of these capabilities, in this roadmap they are generally depicted in the capability in which they predominantly operate. Under each of these distinctive capabilities, investment decisions are further delineated to emphasize key tasks for enabling service and joint force success.



## The Air Force is adapting to profound changes in the nature of conflict and the conduct of war

### Homeland Security

Throughout the strategic guidance, protecting the United States from direct attack is the highest priority of the Department of Defense. Adversaries consider United States territory an integral part of a global theater of combat. The Air Force, therefore applies the key principles of joint warfighting and transformation to the domestic context to defend the homeland.

The Air Force is adapting to profound changes in the nature of conflict and the conduct of war. Asymmetrical warfare, terrorism, cyber attacks, and the threat of chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) weapons demand immediate attention at home and abroad. Advanced Air Force warfighting capabilities are applied against current and emerging threats to prevent attacks, reduce vulnerabilities, protect our people and infrastructure, and assure continuity of operations and continuity of government.

The Air Force contributes toward creating three desired effects to ensure homeland security: preventing, protecting against, and responding to the full spectrum of domestic threats and incidents. These effects parallel the strategic objectives delineated in the July 2002 National Strategy for Homeland Security.

**Prevent:** The ability to deter, detect, predict, and preempt threats to the homeland, especially those that target our air and space capabilities, installations and critical infrastructures, or transit the air, space, and global information infrastructure. Homeland-based capabilities to support civil law enforcement and prevent CBRNE incidents will be vital to domestic incident management actions.

**Protect:** The ability to protect essential personnel and critical infrastructure necessary to project and sustain forces overseas while also providing support to domestic law enforcement and other civil authorities. Homeland-based capabilities include the emergency preparedness activities that ensure continuity of operations and continuity of government.

**Respond:** The ability to save lives, defend threatened resources, and mitigate the effects of attacks while defeating the enemy through precision strikes, disarming/disabling CBRNE weapons, and rapidly supporting the Department of Homeland Security in coordinating the Federal Government's domestic incident management of natural or man-made disasters. It also includes the continuation or restoration of critical military operations at military installations.

Homeland Security is not exclusively a military task. Instead, Homeland Security is best viewed as an integrated and mutually supporting effort among local, state, and federal agencies and the private sector designed to prevent, protect against, and respond to threats to national security and domestic incidents such as natural disasters.

## Transformation

To support United States national security, the Services must maintain broad and sustained advantages over potential adversaries by providing joint force commanders with the most effective solutions to conduct a broad spectrum of joint operations. The capabilities necessary to achieve this have, of course, changed through time, requiring the military to constantly adapt and transform. The Air Force, like all the Services, has contributed significantly to the U.S. military's transformation through the years.

This ongoing transformation of the United States military continues today and is a top priority of the Department of Defense (DoD). Its primary focus is to: (1) exploit new information technologies in the areas of sensors, command and control, and precision munitions to revolutionize warfare by enabling effects-based operations and massing effects rather than forces; and (2) adapt to new irregular, disruptive, and catastrophic threats to United States national security and the unique demands of the future security environment, which include non-state adversaries such as terrorists, drug lords, and insurgents; homeland security; the proliferation of weapons of mass destruction; rapidly emerging threats to our space and information assets; rapidly emerging cruise and ballistic missile threats; urban operations; peace operations; and unpredictable conflict locations.

To play its part in these transformations in support of the joint force commanders, the Air Force is pursuing the following transformation strategy:

Develop transformational capabilities to include cyberspace warfare, non-lethal effects, rapid global attack, joint machine-to-machine integration, and the ability to defeat advanced air defense systems

Work with the other Services, Joint Staff, and other DoD and non-DoD Agencies as well as allies and coalition partners to enhance joint and coalition warfighting

Continue to aggressively pursue innovation to lay the groundwork for transformation

Create new organizational constructs to facilitate transformation and institutionalize cultural change

Shift from threat- and platform-centric planning and programming to adaptive capabilities- and effects-based planning and programming

Break out of industrial age business processes and embrace information age thinking

To highlight one of these areas, the Air Force is making great strides to enhance joint and coalition warfighting.

In the past, each of the Services was often given separate tasks during an operation and mostly stayed out of each other's way. In recent operations, the Services began to more effectively coordinate to produce desired effects. However, the Services are rapidly evolving beyond coordination to effectively integrating their operations. The Air Force is pursuing the following initiatives to improve joint warfighting, many of which are enabled by the future force structure and organizational initiatives detailed in this Roadmap:

### Improved Air Force support of Combatant Commanders (COCOMs):

Warfighting Headquarters (proactive integration with both the Standing Joint Force Headquarters (Core Element) and the Standing Joint Task Force Headquarters joint initiatives)

Joint Warfighting Space (dedicated rapid launch space capabilities to COCOM)

Air and Space Expeditionary Forces (AEFs) (improved way to present forces to COCOM)

Increased spending on joint enablers such as air refuelers, airlift, and C4ISR

### Improved coordination with other Services:

Joint combat air support to ground forces

Battlefield Airmen, improved coordination via Army-Air Force discussions/forums, Air Component Coordination Element, and Joint Air Ground Organization

Joint interoperability efforts

Joint efforts in space ops, special operations, counter-CBRNE, urban operations, and remotely piloted aircraft (RPAs)

Increased joint exercises and training

Joint Centers of Excellence

### Air Force engagement in new joint processes:

Joint concept development and experimentation

Joint Capability Integration and Development System (JCIDS) joint requirements process

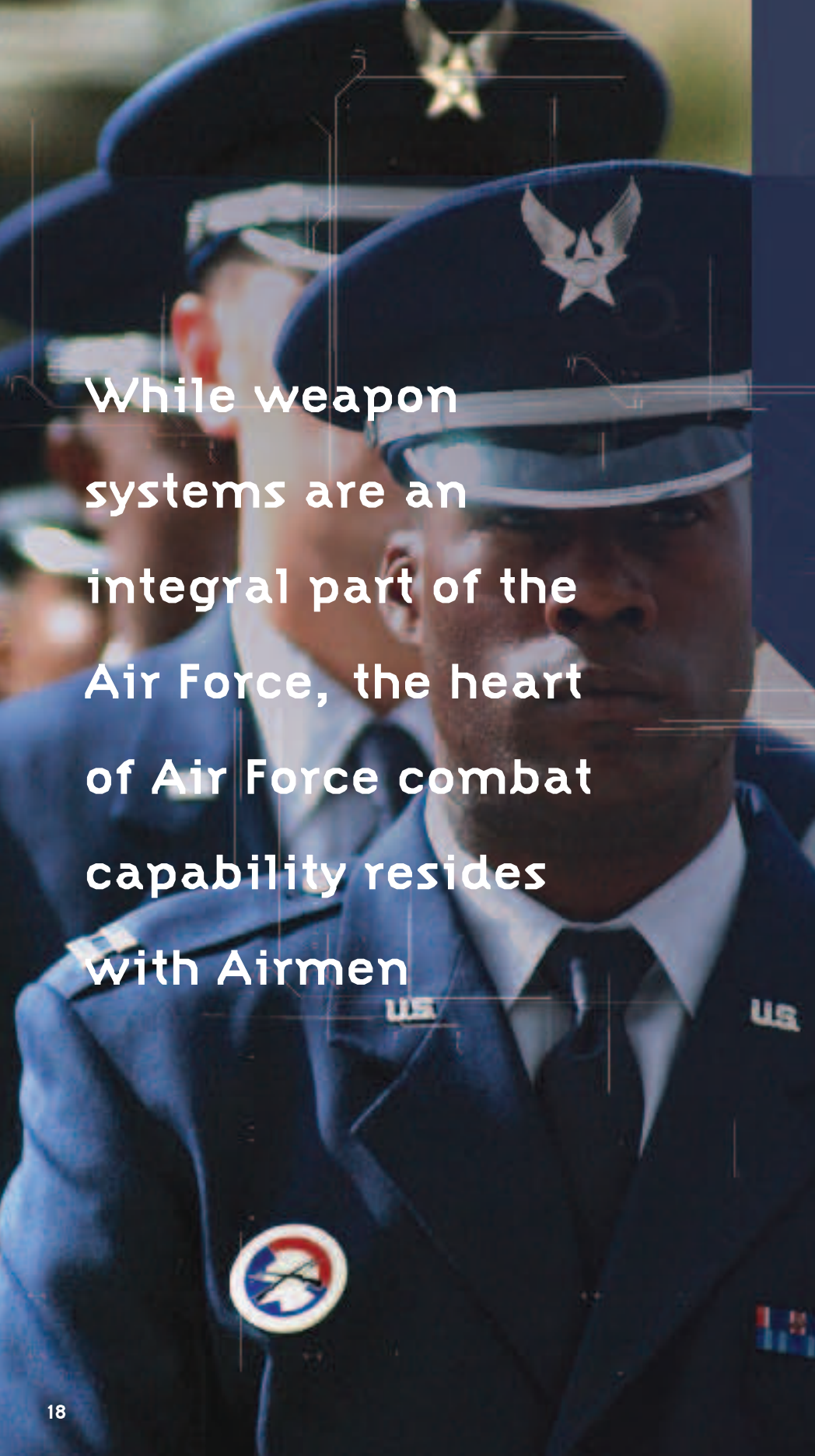
Ensuring existing Air Force CONOPS support new joint concepts

Coalition partners also provide key support to the Air Force. The Air Force will continue to work with allied and coalition air forces to ensure they continue to be interoperable and integrated with the United States Air Force as it continues to transform.

Many of the capabilities enabled by the future force structure and organizational changes highlighted in this document will play a key role in enabling the ongoing transformation of the Air Force. Additional Air Force efforts are highlighted in the U.S. Air Force Transformation Flight Plan, Imagine the Next Century..., and Future Vectors: Assuring Joint Air & Space Dominance in the 21st Century.

### Air Force Smart Operations for the 21st Century

As part of our transformational strategy, the Air Force is committed to pursuing innovation and Continuous Process Improvement (CPI). That commitment is embodied in Air Force Smart Operations 21 (AFS021). The fundamental goals of AFS021 are to achieve internalization of CPI among all military, civilian, and contractor personnel in the Air Force; to identify and remove waste in processes across the Air Force; to develop a sustainable program for CPI within the Air Force; and to continually enhance the peacetime efficiency and wartime effectiveness of the Air Force. Through AFS021, the Air Force will free resources for the future sustainment and modernization of our force structure.



# While weapon systems are an integral part of the Air Force, the heart of Air Force combat capability resides with Airmen

## Developing Airmen

“Right People, Right Place, Right Time — America’s Airmen Creating the World’s Best Air Force,” is founded on the principle that people are the most critical asset. In the past, the Air Force referred to weapon systems, in terms of aircraft such as Joint Strike Fighters and C-17s. The Air Force carefully plans and programs for those systems in terms of their capabilities, the effects they produce, and how many are required. In the future, the same careful planning and programming will be accomplished for Total Force Airmen. Airmen provide effects-based outcomes that no other weapon system can provide and technology-based weapon systems cannot be operated or maintained without capable Airmen. The Airman is Our Most Important Weapon.

As the Air Force prepares itself to meet ever changing challenges, the Total Force requirements must be accurately defined and the force must be shaped, sustained, and effectively developed to ensure the most efficient and effective use of the human resources via organizational and process efficiencies and reductions to the legacy force.

Achieving an effective future force structure is more than developing weapon systems. Through AFS021 initiatives, future organizational structures will flatten, functions will combine, and overlaps will be eliminated. The reduced organizational overhead and elimination of functional overlaps results in a net reduction of work and thereby reduce our overall manpower requirements. Simultaneously, the Air Force culture will be transformed to one that embraces continuous process improvement as a way of life. Additionally, emerging weapon systems are less manpower intensive than most legacy weapon systems. Therefore, as legacy force structure is transitioned out of the inventory and emerging weapon systems enter the inventory, a net reduction in manpower requirements will be realized.

It is just as important that we attract, develop, and retain the Airmen necessary to operate and support these weapon systems to create air and space power for joint force commanders. Every Total Force Airman — Regular, Guard, Reserve, and Civilian — who is not properly developed or utilized represents degraded combat capability to our warfighting commanders. The Air Force is transforming into an effects-based, efficient provider of human combat capability, which can sustain air, space, and cyberspace superiority for the joint force and our Nation. The Air Force provides human combat capability by:

**Defining** Future Total Force requirements to implement a capabilities-based manpower and personnel requirements system that meets surge requirements and optimizes force mix to produce a flexible and responsive force.

**Shaping** the force to produce a high-quality, diversified Total Force composed of the skills, competencies, and grade requirements to provide the right human capability to support Air and Space expeditionary forces.

**Sustaining** a mission-ready force of dedicated Airmen, motivated by the Air Force’s Core Values and the Air Force’s guarantee that their and their families’ well being will be protected.

**Developing** Airmen to ensure the right combination of learning experiences — commissioning, training, education and assignments — which deliberately develops AF-required competencies.

**Delivering** the world’s finest Airmen to combatant commanders — anytime, anywhere.

Only through the Air Force’s continued ability to efficiently produce, train and deliver combat-ready Airmen to the combatant commander, where and when needed, will the Air Force be able to remain the world’s most pre-eminent Air and Space power.

A key strategy for Developing Airmen is the Air Force’s commitment to diversity, not just in gender and ethnicity, but also in thought, creativity, education, culture, and problem solving capabilities. Through this diversity, the Air Force will be able to foster mutual respect and integrity, which enhances critical thinking by creating an environment of competing ideas based on multiple perspectives.

The Air Force Manpower and Personnel Strategic Plan supports the Air Force’s long-term strategy. This is a transformational shift to understanding how the planned and programmed development of human combat capability contributes to the Air Force mission and its core competencies as it provides strategic focus in Developing Airmen:

**To accomplish all facets of air, space, and cyberspace missions  
To bring technology to the warfighter  
To integrate their capabilities into air, space, and cyberspace operations**

The success of Air Force efforts to develop our Airmen is evidenced and measured in terms of an effective force that, when combined with materiel, equipment, and technology, achieves desired capabilities and mission effects.

## Organizations

Organizational transformation has always been a key driver of Air Force force structure and will continue to be in the future. In recent history, there were two notable shifts in the way the Air Force was organized. In 1992, after the end of the Cold War, the Air Force shifted from the Strategic Air Command, Military Airlift Command, and Tactical Air Command organizations to Air Combat Command and Air Mobility Command to meet the new strategic environment. In 1998, the Air Force unveiled the Expeditionary Air Force concept, which serves today as the way the Air Force provides combat-ready, capabilities-focused Air Force Airmen and equipment to joint force commanders.


Today, the Air Force is planning and implementing Total Force Integration, in which Airmen of all components work side-by-side with each other, synergizing their strengths and providing the Air Force with the highest level of combat capability the nation has ever seen. Members of the Air National Guard and Air Force Reserve will move into future weapon systems alongside their Regular Air Force counterparts, operating remotely piloted aircraft, as Battlefield Airmen, in C4ISR and in new aircraft as they come on line.

## Recapitalization

The Air Force's recapitalization challenge is to meet the near-term needs of our Nation, while at the same time ensuring that future Airmen inherit an Air Force that is relevant, capable and sustainable. Superior combat capabilities are needed to meet current and future threats – the primary driver for recapitalization. Maintaining an industrial base is also critical to ensure U.S. preeminence in aerospace.

The Air Force has over 6,000 aircraft in its inventory; however, a significant number operate under flight restrictions. The inventory, whose planes are more than 23 years old on average, is the oldest in Air Force history. Many transport aircraft and aerial refueling tankers are more than 40 years old, and fighters are the oldest ever at more than 18 years average age. The Air Force is experiencing multiple effects of use and aging across its force structure: engine and structural fatigue, deterioration (wiring, fuels system components, and ducting), and corrosion.

The Air Force needs to follow a comprehensive strategy of retirements, procurements and selective service life extensions/modifications to solve this critical recapitalization problem. We must transform to a smaller, more capable force by retiring our oldest, more costly legacy aircraft, and leverage technology to increase capabilities, reduce support costs and mitigate major aging aircraft issues. Finally, we must challenge our aerospace industry to shift its focus to recapitalization and produce more cost effective and supportable aerospace systems.



**Recapitalization**  
**Ensuring future Airmen inherit**  
**an Air Force that is relevant,**  
**capable, and sustainable**

# Freedom to attack Freedom from attack

Air and space superiority is the ability to control the entire vertical dimension, from the surface of the earth to the highest orbiting satellite. It provides freedom to attack as well as freedom from attack. Gaining air and space superiority is a vital first step in military operations and is essential to winning in combat.

Without air and space superiority, everything in the battlespace is at risk, but achieving and sustaining it allows the joint force to prevail quickly, efficiently, and decisively. Various degrees of air and space control are possible. Superiority is a degree of dominance that permits friendly land, sea, air, and space forces to operate at a given time and place without prohibitive interference by the opposing force.

# Air Superiority

Air superiority is a degree of dominance that permits friendly land, sea, air, and space forces to operate at a given time and place without prohibitive interference by an opposing air force. It is a concept that has been the goal of military commanders since aircraft were invented.

Air superiority is the desired state before all other combat operations. Attaining air superiority provides both the freedom to attack and freedom from attack, as well as ensuring freedom to maneuver. Operating without air superiority, when necessary, radically increases risk to surface and air operations.

To achieve air superiority, both offensive and defensive actions are involved. Offensive action involves aggressively neutralizing enemy air, ground, and maritime forces, while defensive actions reactively engage enemy air forces that have already launched on an offensive mission.

By making effective use of the vertical dimension and time, air forces can obtain the initiative, set the terms of battle, establish a dominant tempo of operations, anticipate the enemy, and take advantage of tactical and operational opportunities, and thus can strike directly at the adversary's strategy.

# Air Superiority



## F-22A

The F-22A Raptor is a transformational combat aircraft that delivers Joint Air Dominance to counter persistent and emerging national security challenges. Its capabilities create desired effects when, where, and for the duration they are needed. Its combination of speed and stealth will contribute to its survival in future threat environments, and it is the only fighter produced today that will defeat the threats of tomorrow.

The F-22A is operational now and is in full rate production. While Raptor performance continues to meet or exceed key performance parameters, spiral modernization will further enhance both its air-to-air and air-to-ground target engagement capability to ensure the platform remains the most viable well into the 21st century.

## F-16A

A limited number of older F-16A Fighting Falcon aircraft remain in the inventory to provide air defense support of the homeland. These older legacy aircraft are reaching the end of their service life and, when retired, will be replaced by more modern, capable aircraft that can be dual-tasked to support the air defense mission as well as other roles.



## F-15A-D

The F-15C Eagle is an all-weather, extremely maneuverable, tactical fighter designed to gain and maintain air superiority in aerial combat. It possesses electronic systems and weaponry to detect, acquire, track, and attack enemy aircraft while operating at great distances.

The F-15 provides a mixture of attributes (outstanding maneuverability, acceleration, and range, with capable weapons and avionics) to support the air superiority role.

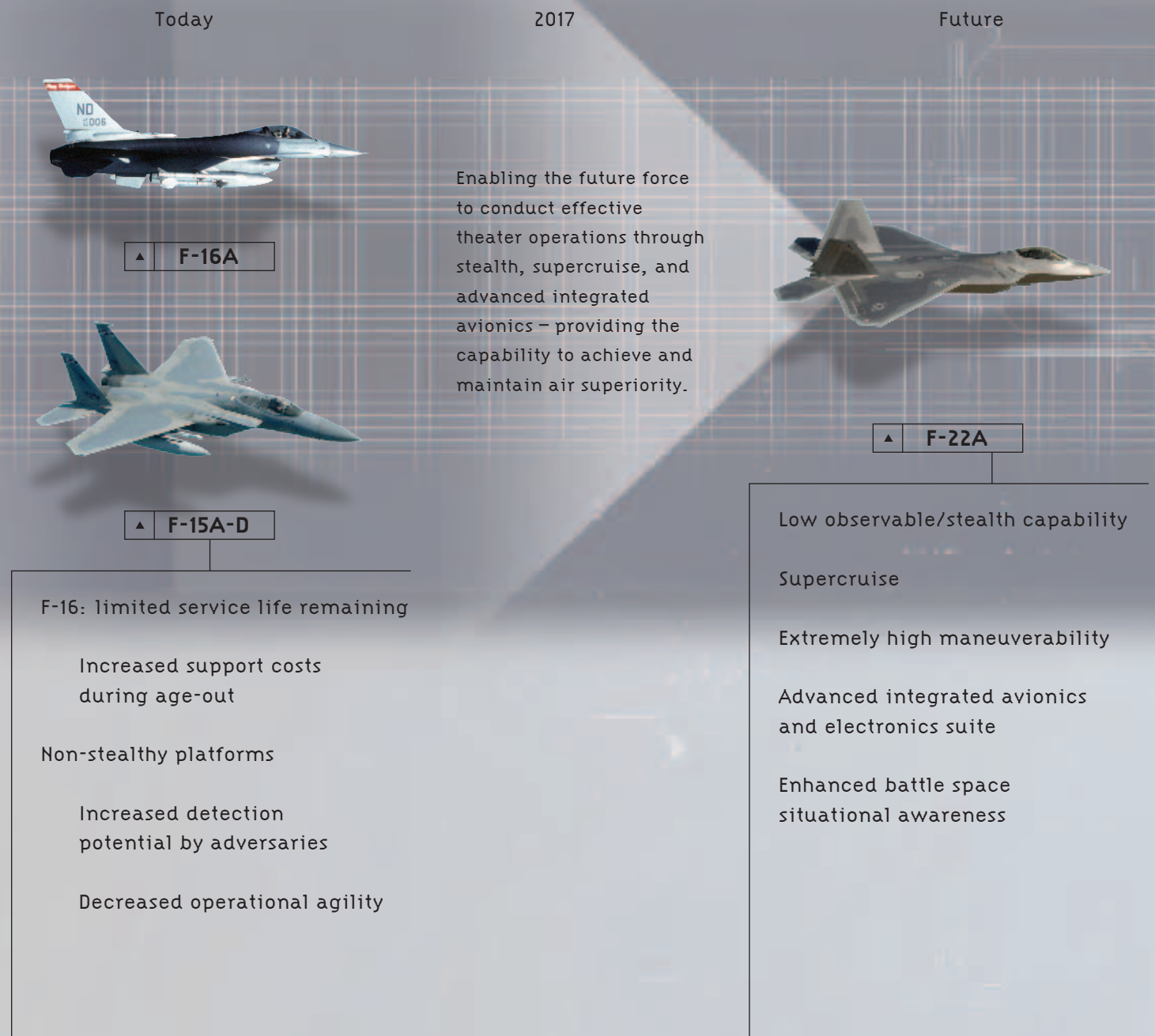
Many F-15 aircraft will retire from the inventory throughout the planning period, but a smaller, dedicated number of aircraft will undergo modernization initiatives to improve their avionics and target detection capabilities and help provide air superiority through 2025.



# Air Superiority Force Structure



## Air Superiority Modernization



# Space Superiority

**Space superiority is that degree of dominance in space of one force over another. It permits the conduct of operations by the dominant force and its related land, sea, air, space, and special operations forces at a given time and place without prohibitive space interference by any opposing force.**

The Air Force achieves and maintains space superiority via counterspace (CS) operations. Space superiority is critically important to protecting the on-orbit satellites that disseminate information, which allows all aspects of military operations.

The CS mission area includes the sub-missions of defensive counterspace (DCS), offensive counterspace (OCS), and space situation awareness (SSA). DCS capabilities seek to deter adversaries from attacking our space capabilities, to defend them if an adversary does attack, and to recover lost capability as quickly as possible after an attack.


The Air Force will address three major DCS needs: advance measures to ensure mission survivability during any known method of attack; mitigate mission impact resulting from an attack and quickly restore services based on mission priorities; and starve the adversary of friendly space force enhancement while maintaining the services for friendly use.

OCS capabilities are intended to negate adversary space services. Between now and the planning horizon, the Air Force will provide the OCS capability to create reversible effects (deceive, deny, disrupt) against adversary space capabilities and irreversible effects (degrade, destroy) against adversary space capabilities.

SSA systems perform find, fix, and track capabilities, as well as object and space environmental characterization functions. The Air Force is responsible for operating and maintaining the majority of the systems, which make up the current Space Surveillance Network (SSN).

The SSN includes ground-based radars and optical sensors, a space-based sensor, and the Space Control Center. The sensors and the Center, in concert with the United States Strategic Command (USSTRATCOM), Joint Intelligence Center (JIC) and Air Force Weather Agency, provide most of the warfighters' SSA.

The primary space-based SSA system is the Space Based Space Surveillance System (SBSS). The SBSS system will provide find, fix, and track capabilities of geosynchronous space objects more consistently and accurately than attainable by ground-based systems. Because SBSS will operate in space, the system will improve current capabilities by being more accurate and timely in response to the dynamic battlespace environment.



**Information superiority  
allows friendly forces  
to collect, control,  
exploit, and defend  
information without  
effective opposition**

Information superiority is a degree of dominance in the information domain which allows friendly forces the ability to collect, control, exploit, and defend information without effective opposition and prevent adversaries from doing the same. Information superiority combines robust, tailored C4ISR capability with effective information operations. Information superiority provides the Joint Force Commander with predictive battlespace awareness to facilitate and conduct precise and persistent attack and to compress the sensor-to-shooter kill chain. It affords the Joint Force Commander the flexibility to anticipate and either assure, dissuade, deter, or defeat threats to the United States and its worldwide interests.

## C4ISR in the space, air, ground, and cyberspace domains

Systems in the **space domain** enhance crucial warfighter decision-making and situation awareness by providing timely communications and information collection. In addition, they provide intelligence vital for monitoring events and status of foreign forces worldwide, developing courses of action, and engaging targets.

Systems in the **air domain** provide command and control (C2) and ISR (C2ISR) capabilities to meet the challenges of finding, fixing, tracking, targeting, and assessing air and ground targets. Future air ISR capabilities will address the Department of Defense's joint need for sophisticated sensing and machine-to-machine interfaces between dissimilar collection resources to better correct gaps in meeting strategic challenges. Future airborne ISR resources will quickly detect, track, and identify air and ground targets; differentiate between friendly, neutral, and hostile forces; and disseminate this information throughout the future C2ISR constellation to the appropriate warfighting elements.

The **ground domain** provides command and control and battle management systems to conduct Joint Operations. Today, the Air Force's command and control resources amplify the effects of force application and information operations and become the centerpiece of joint C2 architectures. Tomorrow, the Air Force will develop advanced C2 battle management and operational integration systems to further facilitate precise, persistent attack and compress the sensor-to-shooter kill chain.

**Cyberspace**, the fourth domain, is the electronic medium of net-centric operations, which includes communications systems, computers, and C2 networks. The ability to exploit cyberspace will afford the Air Force decision superiority and will greatly reduce the time it takes to relay information from sensor-to-shooter. Today's Air Force possesses primarily limited, narrow-bandwidth, unprotected, beyond line of sight communications. The majority of future platforms will be interconnected via data links. The future of net-centric operations will focus on a Constellation Network, which will rely on IP-based routing, shared data, and assured service.

**Information operations** are the integrated employment of influence operations, electronic warfare operations, and network warfare operations, in concert with specified integrated control enablers, to influence, disrupt, corrupt, or usurp adversarial human and automated decision making while protecting the United States capabilities.

**Space systems enhance  
crucial warfighter  
decision-making and  
situation awareness**

Space

Space domain systems provide Satellite Communications; Positioning, Navigation, and Timing; and Surveillance and Reconnaissance space-based C4ISR capabilities. These systems maximize the effectiveness of military air, land, sea, space, and cyber operations from space. From Vietnam to recent operations in Afghanistan and Iraq, military operations have come to depend increasingly on space capabilities as force multipliers. Space systems enhance crucial warfighter decision-making and situation awareness by providing timely communications and information collection.

Domain

# C4ISR : Space

## Satellite Communications (SATCOM)

The Air Force will ensure SATCOM users have uninterrupted capability, while greatly expanding overall communications capacity. Wideband Gapfiller System (WGS) will complement and then replace the Defense Satellite Communications System (DSCS) and the Advanced Extremely High Frequency (AEHF) systems will replace Milstar with launches planned to begin in FY08. Transformational Satellite Communications System (TSAT) will augment and then replace the AEHF systems and WGS constellations. The Air Force plans to advance the current Interim Polar System with Enhanced Polar System. It also plans to equip its forces with the Family of Advanced Beyond-line-of-sight Terminals and Ground Multi-band Terminal, which will bring transformational communication to the joint battlefield.

## Positioning, Navigation & Timing

Modernization of Global Positioning System (GPS) and development of the next-generation GPS III will enhance navigation capability and improve resistance to jamming. The Air Force will begin deploying GPS III as the earlier GPS satellites reach end of life. The Air Force, and other Services, will field systems that provide a Navigation Warfare capability to protect GPS use by the United States and its allies through a high-powered military signal and by denying use of GPS to United States enemies, while preserving the peaceful use of GPS to the world outside of a conflict area.

## Surveillance & Reconnaissance

Surveillance and Reconnaissance capabilities provide combat support operations to improve military forces' effectiveness. Current capabilities gather and disseminate timely and highly accurate information. The United States military has become extremely reliant on these capabilities. The Air Force will continue to lead the world in supporting air, ground, and naval forces from space. It will ensure all new satellite constellation architectures provide responsive, assured mission data capability sufficient to execute wartime plans.

Transforming to meet new threats, the Air Force will field a new capability, a Space Radar (SR), which will incorporate Moving Target Indication and Synthetic Aperture Radar capabilities. SR will include a responsive, day/night, all-weather, agile, multi-mode, high/multi-resolution sensor to meet the needs of both Department of Defense and the Intelligence Community.

The Space-Based Infrared System (SBIRS) is a transformational leap in capability over the aging, but still capable, Defense Support Program (DSP) satellites. The Air Force will build an uninterrupted and modernized missile launch warning capability and ensure adequate service life-extension upgrades to early warning radars take place.

The Nuclear Detonation (NUDET) Detection System (NDS) consists of space, control, and user equipment segments. The space segment consists of NUDET detection sensors on the GPS and DSP satellites. The NDS provides a near-real time, worldwide, highly survivable capability to detect, locate, and report any nuclear detonations in the earth's atmosphere or near-space. The NDS supports NUDET detection requirements for Air Force Space Command (Integrated Tactical Warning and Attack Assessment [ITW/AA]), USSTRATCOM (Nuclear Force Management), and Air Force Technical Applications Center (Treaty Monitoring). The GPS III system will incorporate the NDS.

## Environmental Sensing

In partnership with National Aeronautics and Space Administration and the Department of Commerce, the Air Force plans to replace the Defense Meteorological Satellite Program (DMSP) following development of the National Polar-orbiting Operational Environmental Satellite System (NPOESS), which offers next-generation meteorological capability.

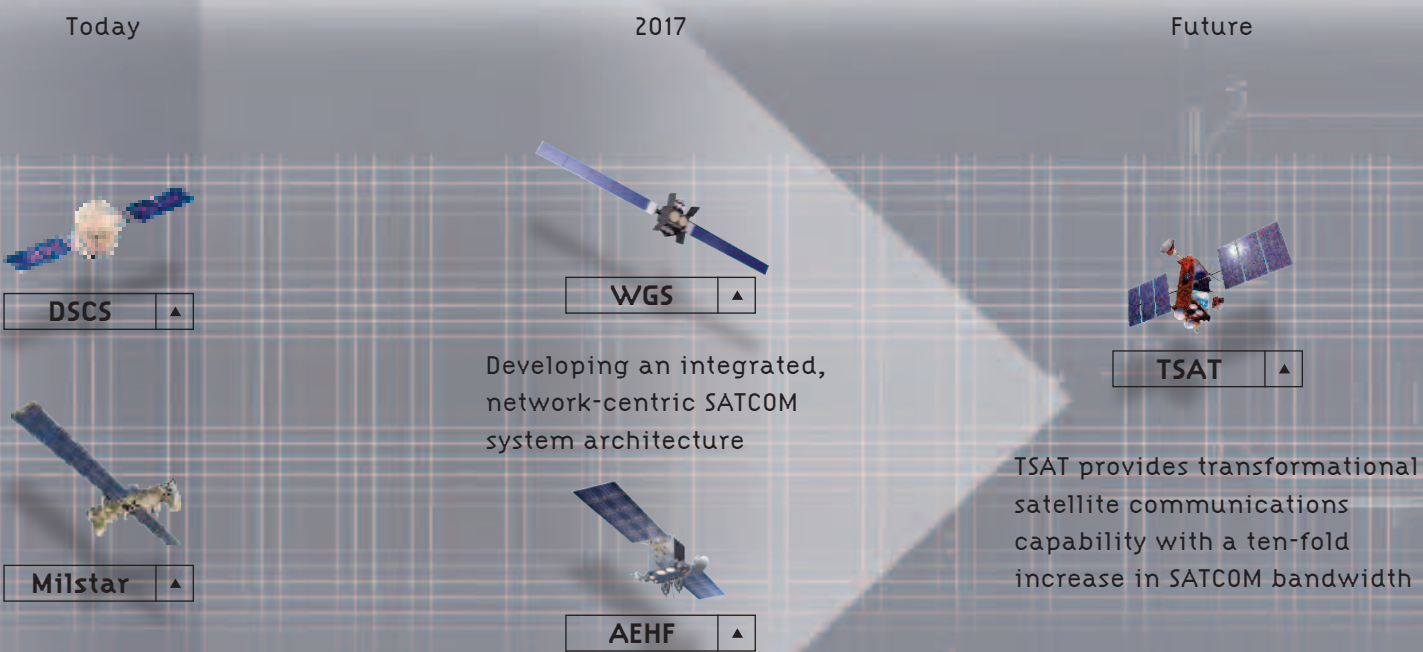
## Near-Space

The Air Force is also exploring the development of near-space, high altitude long loiter C4ISR assets. "Near-space" is the area above the Earth's surface between where air breathing flight can occur and below true orbital space (or between 65,000 and 325,000 feet). Previously not considered applicable for military use, a confluence of technological advancements in power supplies, miniaturization, and lightweight, strong, flexible materials is making near-space capabilities possible. This is causing a re-evaluation of some orbital space concepts for a variety of systems. Near-space deployment of certain capabilities, such as C4ISR, may prove more practical, and possibly more effective and affordable than orbital space methods, and therefore will likely impact future C4ISR force structure if successful.

# C4ISR Space Domain Force Structure



# C4ISR Space Domain Modernization



## Transformational Communications Architecture

Transformational Communications Architecture (TCA) defines a long-term view for transition, emphasizing Internet Protocol driven interoperability as the enabler for new communication solutions. TCA seeks to assure information dominance through improved, shared battlefield awareness; robustly networked Global Information Grid (GIG) elements; time-critical targeting; and enhanced regulatory and spectrum coordination. The satellite components of the TCA will incorporate radio frequency and laser communication links to

meet joint agency requirements for high data rate protected communications. Included in the space-based programs is the TSAT, which integrates assets for mobile/ tactical users and global intelligence via optical cross links and extremely high-frequency radio links. The space segment will extend the GIG to users without fiber connection providing improved connectivity and data transfer capability resulting in a revolutionary change in satellite communications for the warfighter.

# Air Domain

**Find, fix, track, target,  
and assess air and ground  
targets and disseminate this  
information through the C2ISR  
constellation to joint forces**

Systems in the air domain include C2ISR capabilities. Today's airborne ISR force has effectively served to meet constant challenges of finding, fixing, tracking, targeting, and assessing air and ground targets. The Air Force's future force will improve upon past success and address its need for sophisticated sensing and machine-to-machine interfaces and data fusion between dissimilar collection resources to better correct information gaps in meeting asymmetric, potentially catastrophic, and disruptive challenges. Future airborne ISR resources will quickly detect, track, and identify air and ground targets and disseminate this information using machine-to-machine interfaces through the future C2ISR constellation to appropriate shooters, joint C2, and concerned forces. These investments will also significantly enhance ISR's persistence. Specifically, future air-breathing C4ISR plans feature additional MQ-1 (Predator) procurement, continued operation of the stalwart E-3s and RC-135s, and technology demonstration through the E-10A with continued study focused on how to best balance sensors across platforms. Additionally, enhancements and further procurement of the RQ-4 (Global Hawk) will recapitalize the U-2s.

## C4ISR : Air

### MQ-1

The MQ-1 Predator, a remotely piloted aircraft, continues to transform warfighting by providing persistent intelligence, surveillance, and reconnaissance; target acquisition; and strike capabilities against time sensitive targets. Today, with United States based flight and mission control, the Predator truly demonstrates a revolutionary leap in how the Air Force provides military capability. Equipped not only with an electro-optical, infrared, and laser designator sensor, the Predator is also armed with Hellfire missiles. It not only shortens the sensor-to-shooter timeline, but the sensor is now the shooter. Consistent with Total Force Integration, Air Force Special Operations Command (AFSOC) is planning to operate Predator for Special Operations Command, and the Air National Guard will fly up to 12 squadrons.

### E-8

The E-8C Joint Surveillance Target Attack Radar System (JSTARS) is an airborne battle management, C2ISR platform. Its primary mission is to provide theater ground and air commanders with ground surveillance to support attack operations and targeting that contributes to the delay, disruption, and destruction of enemy forces. The radar and computer subsystems on the E-8C can gather and display detailed battlefield information on ground forces. The information is relayed in near-real time to the Army and Marine Corps common ground stations and to other ground command, control, communications, computers, and intelligence nodes.

### U-2

The U-2 Dragon Lady is a single-seat, single-engine, multiple intelligence (multi-INT), high-altitude/near space reconnaissance and surveillance aircraft. It routinely operates at altitudes in excess of 70,000 feet, in all weather environments, day or night to provide critical intelligence to all levels of command and throughout all phases of conflict, including peacetime indications and warnings, low-intensity conflict, and large-scale hostilities. The U-2 is capable of collecting a variety of digital imagery products to include multi-spectral electro-optic, infrared, and synthetic aperture radar imagery, as well as high-resolution, broad-area synoptic imagery using a traditional "wet film" optical bar camera. Additionally, the U-2 has the capability to carry a signals intelligence payload. All digital intelligence can be transmitted in near real-time anywhere in the world via air-to-ground or air-to-satellite data links, rapidly providing critical intelligence to the warfighter.

### RQ-4

The RQ-4 Global Hawk is a high altitude, long endurance, remotely piloted aircraft that provides robust surveillance and reconnaissance capabilities. Through the innovative use of synthetic aperture radar and electro-optical and infrared sensors, Global Hawk provides the warfighter unrelenting observation of intelligence targets in the night, during the day, and in adverse weather conditions. While cruising at extremely high altitudes, Global Hawk can collect information on spot targets and survey large geographic areas. It then provides military decision-makers the most current information about enemy location, resources, and personnel. Dissemination and ground support exploitation systems consistently deliver timely intelligence to bring immediate advantage to combat operations. Global Hawk capability features programmed growth to add signals intelligence and multi-purpose radar technology insertion program sensors. As Global Hawks come on line in increasing numbers, their capability will recapitalize retiring U-2s.



## OF C4ISR : Air

### RC-135U

The RC-135U Combat Sent provides strategic electronic reconnaissance information to the President, Secretary of Defense, Department of Defense leaders, and theater commanders. Locating and identifying foreign military land, naval, and airborne radar signals, the Combat Sent collects and minutely examines each system, providing strategic analysis for warfighters. Information garnered from the data helps determine detailed operating characteristics and capabilities of foreign systems. Evasion techniques and equipment are then developed from this knowledge that will detect, warn of, or defeat these electronic systems. The Combat Sent deploys worldwide and is employed in peacetime and contingency operations.

### RC-135S

The RC-135S Cobra Ball is a self-contained Measurement and Signature Intelligence (MASINT) collection platform, providing Scientific and Technical assessment of foreign ballistic missiles and assisting in treaty verification. The Cobra Ball fleet is nearing completion of significant airframe, navigational and powerplant upgrades which include re-engining from the TF-33 to the CFM-56 engines used on the KC-135R and upgrade of the flight deck instrumentation and navigational systems to the Avionics Modernization Program (AMP) standard. The AMP standard includes conversion from analog readouts to a digital "glass cockpit" configuration.

### RC-135V/W

The RC-135V/W Rivet Joint is a reconnaissance aircraft that supports theater and national level consumers with near real time on-scene intelligence collection, analysis and dissemination capabilities. The aircraft is an extensively modified C-135. The Rivet Joint can detect, identify and geolocate signals throughout the electromagnetic spectrum. The mission crew can then forward gathered information in a variety of formats to a wide range of consumers via Rivet Joint's extensive communications suite. Like the Cobra Ball, the Rivet Joint fleet is nearing completion of significant airframe, navigational and powerplant upgrades, which include similar re-engining and upgrade of the flight deck instrumentation and navigational systems to the AMP standard.



### E-3

The E-3 Sentry is an airborne warning and control system (AWACS) aircraft that provides all-weather surveillance, command, control and communications needed by commanders of the United States, North Atlantic Treaty Organization (NATO) and other allied air defense forces. In support of air-to-ground operations, the Sentry can provide direct information needed for interdiction, reconnaissance, airlift, and close-air support for friendly ground forces. It can also provide information for commanders of air operations to gain and maintain control of the air battle. As an air defense system, E-3s can detect, identify, and track airborne enemy forces far from the boundaries of the United States or NATO countries. It can direct fighter-interceptor aircraft to these enemy targets. Experience has proven that the E-3 Sentry can respond quickly and effectively to a crisis and support worldwide military deployment operations.

# C4ISR Air Domain Force Structure

	2006	2017	2025
RC-135 ▶			
RQ-4 ▶			
MQ-1 ▶			
U-2 ▶			
E-3 ▶			
E-8 ▶			



## C4ISR : Ground

**The centerpiece of joint command and control in the ground segment**

Systems in the ground domain of C4ISR consist of an intricate array of War Fighting Headquarters responsible for command and control and battle management assets, which facilitate the prosecution of joint warfare.

The Air and Space Operations Center (AOC), Combatant Commanders Integrated Command and Control System (CCIC2S), and the Distributed Common Ground Station (DCGS) will continue to develop by amplifying the effects of force application and information operations. The result of this combination of resources will become the centerpiece of joint command and control architectures.

In the future, the Air Force plans to develop advanced C2 Battle Management and Operational Integration Systems to facilitate precision attack and compress the sensor-to-shooter kill chain. The Battlefield Command System represents the ground domain component of this future capability for battle management.

Additionally, ground surveillance and reconnaissance systems contribute to missile warning and space situation awareness capability, while satellite operations provide on-demand execution of any United States government space asset to support the full spectrum of worldwide military operations.

## C4ISR : Ground

### Air & Space Operations Center

The AOC is the weapon system through which the Commander, Air Force Forces (COMAFFOR) or Joint Forces Air Component Commander (JFACC) exercises command and control of air and space forces. It is the senior element of the Theater Air Control System. The AOC provides the facility, equipment, connectivity, and personnel necessary to accomplish planning, directing, and coordinating theater air and space operations through the Air and Space Tasking Order. The AOC has the capacity to automatically display the current air, surface, and space situations using data from all available sources. The AOC plans, tasks, collects, analyzes, disseminates, evaluates, and applies ISR assets and information to satisfy the requirements of the COMAFFOR, JFACC, AOC, subordinate forces, and joint forces. When the U.S. operates with multinational partners, the AOC is expanded into a Combined Air and Space Operations Center (CAOC).

### Distributed Common Ground System

The Distributed Common Ground System (DCGS) is a multi-service, powerful, network-centric, global enterprise. The Air Force portion is designated as the AN/GSQ-272 SENTINEL ISR weapon system. It supports COCOM and forces — primarily at the Joint Task Force level and below — with actionable, decision-quality information in accordance with established priorities. AF DCGS takes advantage of Air Force, sister-service, national, and coalition sensors in the air, on land, in space, and at sea spanning multi-INT sources. It provides tailored, correlated information to those who need it — in the formats, timelines, and channels needed — at all levels across the globe in peace and in combat. It is scalable and comprised of fixed and deployable Total Force components capable of distributed worldwide operations. The AF DCGS is the Air Force's primary warfighting Tasking, Processing, Exploitation, and Dissemination architecture.

### Battlefield Control System

The Battlefield Control System (BCS) — Fixed is a front-line weapon system that provides Theater Battle Management functions with expanded capabilities in Dynamic Battle Control at the tactical, execution level. It accepts, processes, and correlates/fuses data from multiple sensor/information sources to share throughout the battlespace using a multitude of communications systems including the GIG. The BCS is the key air domain component of North American Air Defense's (NORAD's) ITW/AA system. BCS modernization will provide NORAD, the President, the Secretary of Defense, and the National Military Command Center with a capability to display an integrated air and space picture with data from air, land, space, and maritime assets.

### Combatant Commanders Integrated Command and Control System (CCIC2S)

The Air Force has developed a worldwide C2 system, which provides the commanders of NORAD and USSTRATCOM the ability to quickly and effectively monitor and assess worldwide events. CCIC2S supports the Cheyenne Mountain Operations Center, which supports NORAD's missions and portions of USSTRATCOM's space operation mission. One of the most important functions within CCIC2S is near-real time warning and assessment of attacks against North America from missiles, aircraft, and space threats.

## C4ISR : Ground

### Integrated Tactical Warning and Attack Assessment

The Integrated Tactical Warning and Attack Assessment system integrates and correlates missile launch, space object identification, and air surveillance information to assess the nature of an enemy attack and issue warnings to the President of the United States, the Prime Minister of Canada, United States Secretary of Defense, and warfighting Combatant Commanders.

### Ground Surveillance and Reconnaissance

There are six early warning radars, which provide long-range warning of a missile attack over the polar region of the northern hemisphere. These also provide satellite-tracking data. While these systems can only spot missiles when they appear over the horizon, the DSP early warning satellites complement these ground radars with a view from orbit. The Air Force plans to operate these surveillance systems through 2025.

### Cheyenne Mountain Operations Center

Cheyenne Mountain Operations Center is the C4 heart of the ITW/AA system. Additionally, Mobile Command and Control Centers (MCCCs) provide C2 continuity to Combatant Commanders in event of primary facility incapacitation. MCCC is planned to be retired and replaced with a new distributed ground-based communications system.

### Space Situation Awareness Systems

Ground-based SSA systems provide crucial knowledge for protection of space systems and effective operations against adversary space capabilities. The Air Force's SSN detects, tracks, catalogs, and identifies man-made objects orbiting Earth. The SSN is comprised of phased array radars, mechanical radars, a multistatic radar, optical systems, and a space-based optical system. SSN sensor missions are designated as dedicated, collateral, or contributing. The Air Force's current dedicated SSA ground sensors include the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system, the Moron Optical Space Surveillance (MOSS) system, the Eglin Phased Array Radar, and the Globus II sensor.

## C4ISR : Ground

### Rapid Attack Identification, Detection, and Reporting System

The Rapid Attack Identification, Detection, and Reporting System (RAIDRS) Spiral 1 is a new system, which will provide satellite communication electromagnetic interference detection, geolocation, and reporting. Future capability increments will provide the necessary sensors, automated analysis, data fusion, and decision support to detect, characterize, assess and report attacks on space systems used by the DoD for the purpose of enabling timely protection decisions at levels from operational squadrons through combatant commands.

### Satellite Operations

The objective of satellite operations is on-demand execution of any United States government space asset to support the full spectrum of worldwide military operations. The Air Force will also develop an infrastructure for evaluating space systems prior to declaring them operational. The Air Force will sustain the Air Force Satellite Control Network and in the mid- and far-terms evolve satellite operations capability to produce a national resource that will be interoperable, more robust, responsive, and able to support faster spacecraft initialization times. This Intergrated Satellite Control Network (ISCN) will employ dual and multi-band spectrum flexibility to meet interoperability needs and to be more robust. The ISCN will improve the Air Force's ability to respond quickly to changing warfighter requirements. The ISCN will also allow a new architecture to meet the needs of a future environment with more satellites, increased operational tempo, greater dependence on commercial hardware, software, and digital communications, and the potential for expanded military presence in space.

## C4ISR : Cyberspace

Cyberspace is the electronic medium of net-centric operations, communications systems, and computers, in which online communication takes place. Net-Centric Warfare (NCW) exploits information superiority. It generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. NCW operations are conducted through a dynamic combination of hardware, software, data, and human components in cyberspace, the information domain.

The Constellation Net is defined as an interconnected and interrelated collection of systems storing or transmitting information. Its ability to harness cyberspace will afford the Air Force decision superiority, which will greatly reduce the time it takes to relay information from sensor-to-shooter.

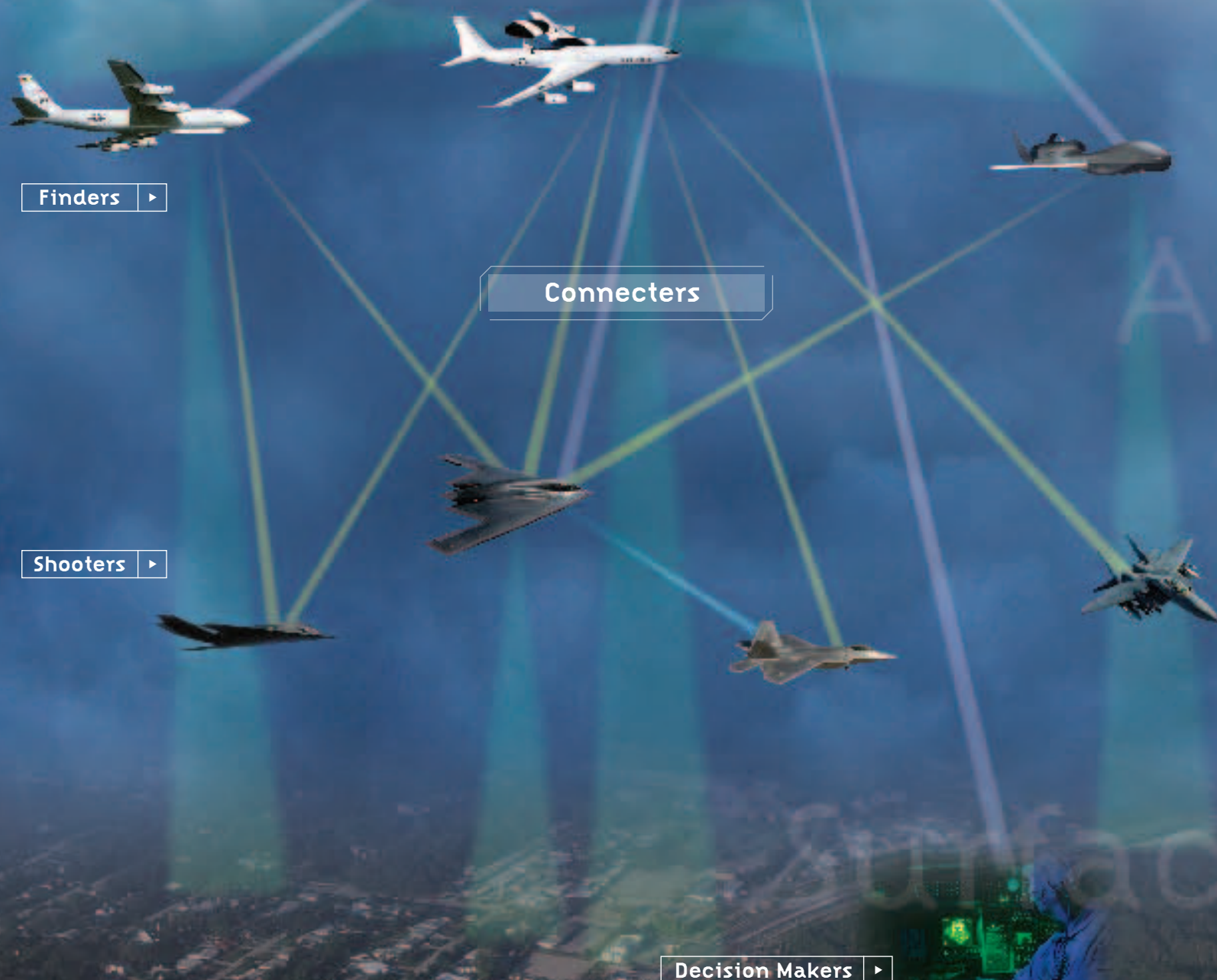
NCW provides the framework for the Air Force to achieve this vision. It is currently “pushing” information in the battlespace. In the future, the Air Force will be able to “push” very rapidly, but more importantly, it will be able to “pull” information from the network that is tailored to the warfighter’s needs. The vision is to create a “publish and subscribe” environment that provides information on demand. This “subscriber” environment will significantly enhance situational awareness and greatly shorten the kill chain.

Adversaries recognize the United States military’s dependence on networks and electronic information and the importance of sharing data — all of which are main principles of the evolving net-centric warfare strategy. To ensure the uninterrupted flow of data, the Air Force is enhancing Network Operations (NetOps). NetOps encompasses information assurance, system and network management, and information dissemination management. NetOps consists of organizations, procedures, and functionalities required to plan, administer, and monitor Air Force networks in support of operations and also to respond to threats, outages, and other operational impacts.

In the future, an Air Force Net Control System (AFNCS) will be responsible for operating and defending the Air Force-provisioned portions of the GIG. The AFNCS provides end-to-end assured service as IP-based connectivity expands from terrestrial links to include airborne, and space-borne nets.

# C4ISR : Cyberspace

## Net-Centric C4ISR Operations



### C2 Constellation

The Air Force's contribution to the overarching concept for net-centric warfighting operations is the C2 Constellation — the Air Force's component to the GIG. The C2 Constellation is a family of C4ISR systems sharing horizontally and vertically integrated information through machine-to-machine conversations enabled by a peer-based network of sensors, command centers, and shooters. Both an operational construct and an architectural framework, it guides Air Force development of people, processes, and technology toward network-centric operations.

### Constellation Net

The Air Force provides transport and computing layer components of the overall DoD GIG through Constellation Net — air, space, and terrestrial communications network — that facilitates free flow of information, rapidly accessible to our warfighters. The Air Force portion of GIG Bandwidth Expansion provides expanded terrestrial service at key Air Force bases globally. The Joint Tactical Radio System is essential to the Air Force vision for an improved airborne network, which expands genuine network operations to the airborne platforms. With the installation of Family of Advanced Beyond-Line-of-Sight Terminals on additional aircraft, such as AWACS, JSTARS and Global Hawk, the Air Force will have the capability to extend its wideband airborne network to all reaches of the globe. Finally, the Air Force is responsible for a large portion of the space segment communication evolution, including deployment of the Advanced EHF, Wideband Gapfiller System, and the Transformational Satellite Communications systems.

The constellation represents the effort to fully connect the array of land, platform, and space-based sensors using common standards and communication protocols to relay information automatically, essential to joint battle management command and control. The constellation will provide vastly improved C4ISR capabilities to operators.

# Information Operations

electronic warfare   network warfare   influence operations

Information operations are critical to achieving information superiority as they protect our ability to get the right information to the right place at the right time while preventing our adversaries from achieving the same. The Air Force is committed to information operations, both to assure NCW capability (physically and in cyberspace) and to maintain the ability to maneuver and operate while supporting delivery of lethal and non-lethal effects.

Information operations consist of electronic warfare (EW), network warfare (NW), and influence operations. While EW has been and continues to be a requirement, the threat's increasing countermeasure sophistication, along with the requirement to recapitalize aging capabilities are driving continued investment in this portfolio of assets. EW recapitalization features the Miniature Air-launched Decoy-Jammer (MALD-J), Active Electronically-scanned Array (AESA), and ultimately an EC-130H (Compass Call) follow-on. NW is increasingly becoming a critical capability the more reliant the Nation and Allies become on the free and unobstructed use of networks. The Air Force is focusing on building capability in this area. The Air Force plans to sustain current influence operations activities while increasing the level of capability to conduct precision influence operations and targeting.

## EC-130H

The EC-130H Compass Call is the DoD's premier Electronic Attack and Information Warfare weapon system. Compass Call's mission is to counter advanced command, control, and communication systems and conduct stand-off jamming of air defense radars. Its primary role is to increase the survivability of combat aircraft and aircrews by denying effective command and control of the enemy integrated air defense system, and disrupting air defense surface-to-air missile and anti-aircraft artillery threats. Compass Call also supports ground and special operations forces by denying hostile forces and terrorists the communications and situational awareness needed to coordinate operations against U.S. and allied troops.

Compass Call is a core component of the Joint Airborne Electronic Attack system of systems and has consistently demonstrated a powerful effect on enemy command and control networks in multiple military operations including Panama, Bosnia, Kosovo, Serbia, Afghanistan and Iraq. With the inherent ability to be quickly modified to counter new threats and emerging targets, this versatile platform is able to bring essential capabilities to virtually any combat operation. Future transformation efforts will include a sufficiency and requirements analysis to determine how to address the increased demand for platforms driven by the long-term War on Terror strategy.




## Ability to attack rapidly anywhere on the globe, at anytime

**Global attack is the ability to engage adversary targets rapidly and persistently with a wide range of munitions anywhere and at anytime to hold any adversary at risk.**

Global attack relies on the military attributes of air and space power – speed, range, flexibility, precision, and persistence – to give the joint force the ability to find and attack targets of choice anywhere within the battlespace and throughout the full spectrum of conflict.

The ability to engage globally and apply force, using various weapon systems to provide both lethal and non-lethal effects, is vital to supporting the joint force as it faces both traditional and irregular threat environments. Comprised of manned and remotely piloted aircraft and intercontinental ballistic missiles, current and future global attack systems provide regional and deep strike capabilities through a variety of platforms and weapons.

Future systems will contribute improved adaptive capabilities of speed, persistence, and stealth with a mix of payloads to precisely engage hardened, deeply buried, mobile or moving targets, deep in enemy territory in adverse weather, with enhanced survivability in the battlespace.



## F-35A

The F-35A Joint Strike Fighter will be a stealthy, multi-role, strike aircraft providing high lethality, maneuverability, survivability, and maintainability. The F-35A will be capable of performing air-to-air and air-to-ground missions for the Air Force, Navy, Marine Corps, and partner countries.

The Air Force's F-35A will replace the F-16 and A-10 fleets and complement the F-22A and will employ a new generation AESA radar for scanning and tracking targets. Data collected by the AESA will be fused with information from multiple on-board systems, and off-board sources (e.g., AWACS, JSTARS, Rivet Joint, satellites) to provide enhanced aircraft and strike package mapping, strike precision, and jamming capabilities.

The aircraft's maneuverability and integrated avionics will make it superbly suited to effectively support ground operations, and its air-to-surface capabilities and stealth characteristics will allow for highly effective employment during suppression of enemy air defenses as well as deep interdiction missions.

An advanced sensor suite will allow the F-35A to perform battle damage assessment, intelligence, and reconnaissance missions to provide enhanced battlespace awareness for the Integrated Strike Force and Combatant Commander. The F-35A will remain a capable multi-role platform well into the 21st century.



## F-22A

In its global attack role, the F-22A Raptor projects air dominance rapidly and at great distances to defeat threats attempting to deny access to friendly forces. Providing critical air-to-ground stealth capability with the retirement of the F-117, the F-22A can carry joint direct attack munitions internally and will use on-board avionics for navigation and weapons delivery. Future air-to-ground capability will be enhanced with addition of an upgraded radar, sensors, and carriage of small diameter bombs and other munitions. Also in its air-to-ground configuration, the F-22A will retain carriage capability of two AMRAAM and two AIM-9 air-to-air missiles.



## F-15E

The F-15E Strike Eagle is a dual-role fighter designed to perform air-to-air and air-to-ground missions. An array of avionics and electronics systems gives the F-15E the capability to fight at low altitude, day or night, and in all weather. The Strike Eagle provides a ground-strike, deep-interdiction capability and is capable of performing air superiority missions. It utilizes an on-board electronic defensive suite to increase survivability.

The F-15E's versatile avionics and ability to carry a mix of payloads make it a competent global attack system while modernization initiatives to its integrated electronics and target detection capabilities will enhance its air-to-ground and air-to-air roles to provide support to the joint force through the end of the 2025 planning period.



## MQ-9

The MQ-9 Hunter Killer is a remotely piloted aircraft that is primarily employed in a hunter/killer role against dynamic targets. It has the capability to carry up to 750 pounds of internal and 3000 pounds of external precision guided munitions. The MQ-9 also provides near-real-time imagery intelligence to satisfy reconnaissance, surveillance, and target acquisition mission requirements of tactical commanders.

In its role as an ISR asset, the MQ-9 is part of a system of ISR assets that support strike aircraft by acquiring and tracking targets. It may also support operations such as coastal and border surveillance, weapons tracking, embargo enforcement, humanitarian/disaster assistance, peacekeeping, and counterdrug activities.

The MQ-9 carries a larger, more capable, synthetic aperture radar than the MQ-1, as well as a laser target designator, and various detection systems to provide a viable engagement system through the planning period.

## F-16

The F-16 Fighting Falcon is a lightweight, single-engine, high-performance, multi-role tactical fighter. This aircraft can perform precision strike, suppression of enemy air defenses, night attack, and beyond-visual-range interception missions.

The F-16 can locate targets in all weather conditions and detect low-flying aircraft in radar ground clutter. Some older models of the F-16 are primarily air superiority assets that support homeland defense commitments, but most are multi-role and can operate as the Joint Force Commander requires.

The F-16 will reach the end of its service life during the planning period and will be replaced by the F-35A.

## A-10

The A-10 Thunderbolt is the primary Air Force ground attack fighter. The A-10 utilizes its massive cannon and heavy weapons load to conduct close air support and forward air control in day or night operations. It is a simple, effective, and survivable twin-engine jet aircraft that can be used against all ground targets, including tanks and other armored vehicles.

The A-10 has excellent maneuverability at low air speeds and altitude and is a highly accurate weapons-delivery platform. The A-10 will undergo structural, avionics, and engine modernization upgrades and remain in the inventory through the end of the planning period.

## F-117A

The F-117A Nighthawk is the world's first operational aircraft designed to exploit low-observable stealth technology. This precision-strike aircraft penetrates high-threat airspace and uses laser-guided weapons against critical, high-value targets. While providing a highly effective first generation stealth capability for precision employment, the F-117 will retire in the near term to make way for more modern systems.

## B-2

The B-2 Spirit is a long-range, multi-role, air refuelable bomber that is capable of delivering nuclear or conventional munitions on intercontinental missions without refueling. The B-2 capitalizes on stealth technology, having been designed to minimize observable radar, infrared, acoustic, visual, and electromagnetic emissions signatures. The B-2 conducts long-range power projection missions; strike/deep attack/interdiction of hard, fixed, and mobile targets. It can be used to halt an enemy attack by launching from Continental United States (CONUS) and striking at such critical targets in the area of hostilities as air defenses, power grids, and armored vehicles, especially in the early stages of conflict. Avionics and other modernization upgrades will enhance the B-2's capabilities to remain a viable long range platform through the planning period.

## B-52H

The B-52H Stratofortress is an air refuelable, long-range bomber aircraft capable of performing a variety of missions, including show of force, maritime interdiction, strategic attack, precision strikes, and defense suppression.

It provides massive firepower in low-threat environments with a standoff attack capability for high-threat environments. While reduced in numbers, the B-52H will continue to be upgraded and modernized to remain in the inventory through 2025.

## Minuteman III

The Minuteman III (MMIII) intercontinental ballistic missile (ICBM) is an element of the nation's strategic deterrent forces. Nuclear deterrence has been and will continue to be one of our nation's highest priorities. Consistent with the Nuclear Posture Review, the Air Force will complete several MMIII modernization and life extension programs to provide a sustainable ICBM force through 2020. The Air Force is also completing an Analysis of Alternatives and other pre-acquisition activities to prepare for development of follow-on ICBM capabilities beyond 2020. Such efforts will address MMIII age-out and spare asset depletion, as well as provide improved operational capabilities to meet post-Cold War deterrence requirements.

## New Bomber

The Air Force will develop a new bomber to be fielded by 2018. The new bomber will have the range, persistence, payload, and survivability characteristics to operate in contemporary and new threat environments. The development of this new bomber and continued pursuit of leap-ahead technologies will ensure the modernization and recapitalization of Air Force long-range strike capabilities for the long term.

## B-1B

The B-1B Lancer is an all-weather, long-range, multi-mission, precision strike aircraft capable of flying intercontinental missions without refueling. Carrying a variety of precision standoff and direct attack munitions, the B-1B can destroy point or area targets with great accuracy and mass.

Using three internal bays, the B-1B can employ 54,000 pounds of ordnance – the largest capacity for any U.S. combat aircraft. The B-1B will remain a viable long range system through the planning period.

Global Attack Force Structure

2006

2017

2025

F-22A ▶



F-35A ▶



F-117 ▶



F-16A-D ▶



F-16C-D ▶



F-15E ▶



A-10 ▶



Global Attack Force Structure

2006

2017

2025

B-1B ▶



B-2 ▶



B-52H ▶



New Bomber ▶

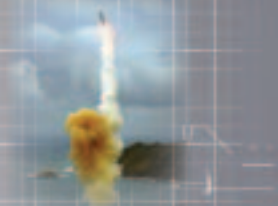
New Bomber

New Bomber

MQ-9 ▶



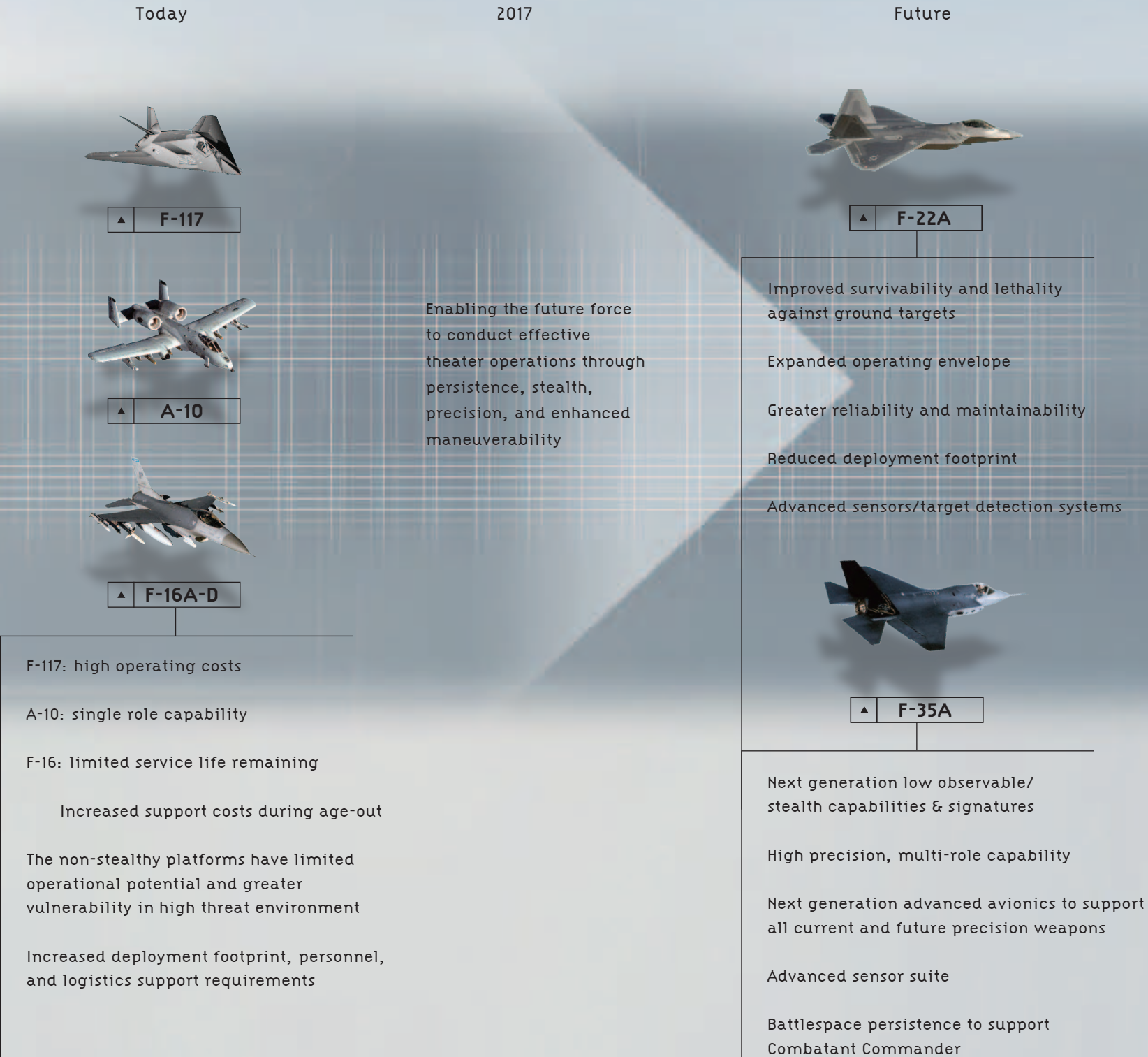
Minuteman III ▶



Minuteman III Replacement

Global Attack Modernization

Global Attack Modernization




## Sustaining Joint Force operations around the world

Global Reach is the strategic effect created by Global Mobility. Global Mobility is the concept for air refueling, airlift, spacelift, and other capabilities which together enable and sustain Joint Force operations around the world

Air mobility, a combination of airlift, air refueling, and spacelift, provides our nation the strategic agility to deploy, employ, and sustain United States military power anywhere, on our own initiative at a speed and tempo that our adversaries cannot match. Often though, it is air mobility's non-lethal application of air power that directly achieves national security objectives.

Fundamentally, air mobility is about warfighting. Given the appropriate level of defensive systems to operate across the full battlespace, it is an enabler, which guarantees that the United States can quickly project combat power anywhere, anytime.



## Airlift provides United States military forces the global reach to quickly apply strategic global power

Airlift is the transportation of personnel and materiel through the air, which can be applied across the entire range of military operations to achieve or support objectives and can achieve tactical through strategic effects. Airlift provides rapid and flexible mobility options that allow military forces as well as national and international governmental agencies to respond to and operate in a wider variety of circumstances and time frames. It provides United States military forces the global reach capability to quickly apply strategic global power to various crisis situations worldwide by delivering necessary forces.

The power projection capability that airlift supplies is vital since it provides the flexibility to get rapid-reaction forces to the point of a crisis with minimum delay. Airlift can serve as American presence worldwide, demonstrating resolve, as well as serve as a constructive force during times of humanitarian crisis or natural disaster.

The backbone of United States power projection is the fleet of C-17 Globemaster III, C-5 Galaxy, and C-130 Hercules aircraft. The C-17, in concert with the C-5, partners to provide the bulk of intertheater airlift moving personnel, and oversized and outsized cargo. The C-17 has the unique ability to function as an inter-theater and intra-theater airlift asset and serves as a force multiplier. The C-130 and C-17 provide the intra-theater movement of personnel and cargo.

As these systems age, the Air Force will take steps to modernize/recapitalize the mobility fleet to meet the call for rapid global mobility. These solid performers will take the Air Force into 2025 and beyond. Various modernization programs are underway to re-engine and modernize the C-5A/B to improve reliability and responsiveness as the C-5M, and to modernize the C-130 fleet. Additionally, the future Joint Cargo Aircraft will augment intra-theater capability.

Operational Support Airlift (OSA) are the C-40, C-38, C-37, C-21, C-20 and C-12. The Air Force maintains these aircraft to support the wartime requirements of the Combatant Commanders and services. During peacetime, these aircraft support the movement of Congressional members and senior DoD/military service's team travel.

Very Important Person Special Airlift Mission (VIPSAM) aircraft, VC-25, C-40, C-37, C-32, C-20 and UH-1N provide airlift for the President, Vice President, Cabinet members, Congress, other senior government/DoD officials, and other Heads of State. VIPSAM aircraft do not deploy in support of Combatant Commanders.

## C-17

The C-17 Globemaster III continues to be a success story for the joint warfighter, supporting the deployment of personnel and cargo in Iraq and Afghanistan, as well as numerous other locations around the globe. From October 2004 through October 2005, C-17s flew over 63,000 sorties, bringing the total number of Operation ENDURING FREEDOM and Operation IRAQI FREEDOM missions to more than 109,000. The C-17 achieved this goal with a mission capability rate of 83.3%.

In addition, the C-17 flew more than 100 humanitarian and disaster relief missions in support of Hurricanes Katrina and Rita, as well as the October 2005 earthquake in Pakistan. With this performance record and the Air Force's reliance on its capability, the continued viability of the C-17 is critical for meeting the Nation's airlift requirements.

## C-130J

The C-130J Hercules is the latest and most advanced version of the C-130, designed to perform intra-theater airlift. It is more fuel-efficient and has greater range than previous versions. The C-130J is powered by more powerful engines, which increase the C-130's ceiling to 42,000 ft. (compared to the C-130H's ceiling of 33,000 ft.). The C-130J has all-digital avionics and mission computers. Nearly all of the gauges are now displayed on computer screens, and the pilot can select between several optimum displays during different phases of the flight.

The C-130J has increased reliability and maintainability, reducing the cost of ownership by as much as 45% depending on the scenario for use. All C-130Js have an All-Weather Aerial Delivery System capability. The cargo ramp and door opening are designed to open at 250 knots, allowing for high speed target ingress/egress. The C-130J conducts humanitarian relief missions and can be utilized for medical evacuations. It supports ground operations through the delivery of paratroopers and equipment to austere runways at forward bases. The Hercules can be used in conjunction with the C-5 and C-17 to enhance global airlift capability. It will be equipped with the Large Aircraft Infrared Countermeasures (LAIRCM) system, which will work in conjunction with other onboard self-protection systems.

## C-5

The C-5 Galaxy provides outsized/oversized cargo and passenger airlift. It is capable of airlifting 180,000 pounds of cargo up to 3,200 nautical miles. It is also capable of carrying 73 passengers, inclusive of cargo weight. Two modernization programs address C-5 issues: the AMP and Reliability Enhancement and Re-engining Program (RERP).

AMP provides a fully supportable Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) compliant avionics suite ("glass cockpit"). RERP replaces engines with commercially proven, more powerful engines and refurbishes nine major unreliable aircraft systems. Projected performance improvements include increases in fleet logistics departure reliability to 91% and wartime MC rate over 75%. Upon completion of AMP & RERP, the airplane will be re-designated the C-5M.

## JCA

The Joint Cargo Aircraft (JCA) offers a light airlift solution to support requirements of all Services for supply of combat forces near or in the battle arena. Like the C-130J, this aircraft will have a cargo/passenger capability and can operate from unimproved surfaces. Additionally, the JCA will have night vision options that complement its ability to operate in a black-out mode, exploiting cover of night in austere locations.

The JCA is expected to have an upgraded suite of avionics to include precision navigation to enhance its airdrop mission. Its short field ability coupled with its load versatility will give the JCA a great capability to contribute to the War on Terror and disaster response.

Airlift Force Structure

2006

2017

2025

C-17 ▶



C-141 ▶



C130E/H/J ▶



C130H/J ▶



C-5A/B/C/M ▶



JCA ▶

JCA\*

JCA

JCA



# Air refueling increases the range, payload, loiter time, and ultimately the flexibility and versatility of combat, combat support, and mobility aircraft

Air refueling is the in-flight transfer of fuel between tanker and receiver aircraft. An aircraft's ability to remain airborne is limited by the amount of available fuel. By increasing range or endurance of receivers, it is a force enabler; by allowing aircraft to take off with higher payloads and not sacrifice payload for fuel, it is a force multiplier.

The Warfighter demand for air refueling in support of all Services' air forces across the full range of military operations continues to grow. As the primary provider of this critical force multiplier, the Air Force is working hard to find cost effective ways to satisfy the future requirement for air refueling capacity with an aging fleet.



## KC-135

The KC-135 Stratotanker is the oldest aircraft in the Air Force inventory averaging roughly 45 years old. Major overhauls converted the KC-135A to the KC-135E and/or the KC-135R. The combined fleet presently numbers over 500 aircraft.

Though current plans for the KC-135R sustain the fleet well beyond 2025 while retiring the older, less capable KC-135Es in the near term, analysis is underway to find the best approach to recapitalize these critical assets.

The Air Force has a program underway to recapitalize the tanker fleet which is being shaped by the results of the KC-135 Recapitalization Analysis of Alternatives, the Mobility Capabilities Study, and the Fleet Viability Board reports on KC-135s. These results will further define the size of the future tanker force, mix of tanker capability, and the timing and pace of recapitalization.

## KC-10

The KC-10 Extender gives the Air Force a powerful dual role capability with its ability to perform as an airlifter and a refueler in a single mission.

The KC-10 is capable of both giving and receiving fuel, and can offload fuel through either its fixed boom, or retractable drogue. First delivered in 1981, this fleet of 59 aircraft is approaching 25 years old.

Efforts are underway to modernize the airframe in order to provide a fully digital aircraft capable of meeting future worldwide airspace requirements. As with the KC-135, the Air Force is reviewing options to eventually replace the KC-10.

## KC-X

Future Tanker (KC-X): The future tanker requirements document is being prepared with the intent of providing the most versatile tanker platform the military has seen to date. The KC-X is envisioned as both a tanker and cargo/troop carrier, with suitable floors, doors and defensive systems. As a tanker, the KC-X will be able to give and receive fuel, and, like the KC-10 transfer fuel to either boom or drogue receivers without a ground reconfiguration.

In its capacity as a cargo/troop carrier, the KC-X will provide the warfighter with increased capability and flexibility as it quickly configures to meet the requirements of the mission. With newer more powerful engines, this aircraft will be able to operate from shorter runways and carry larger quantities of fuel and cargo than we are capable of today.

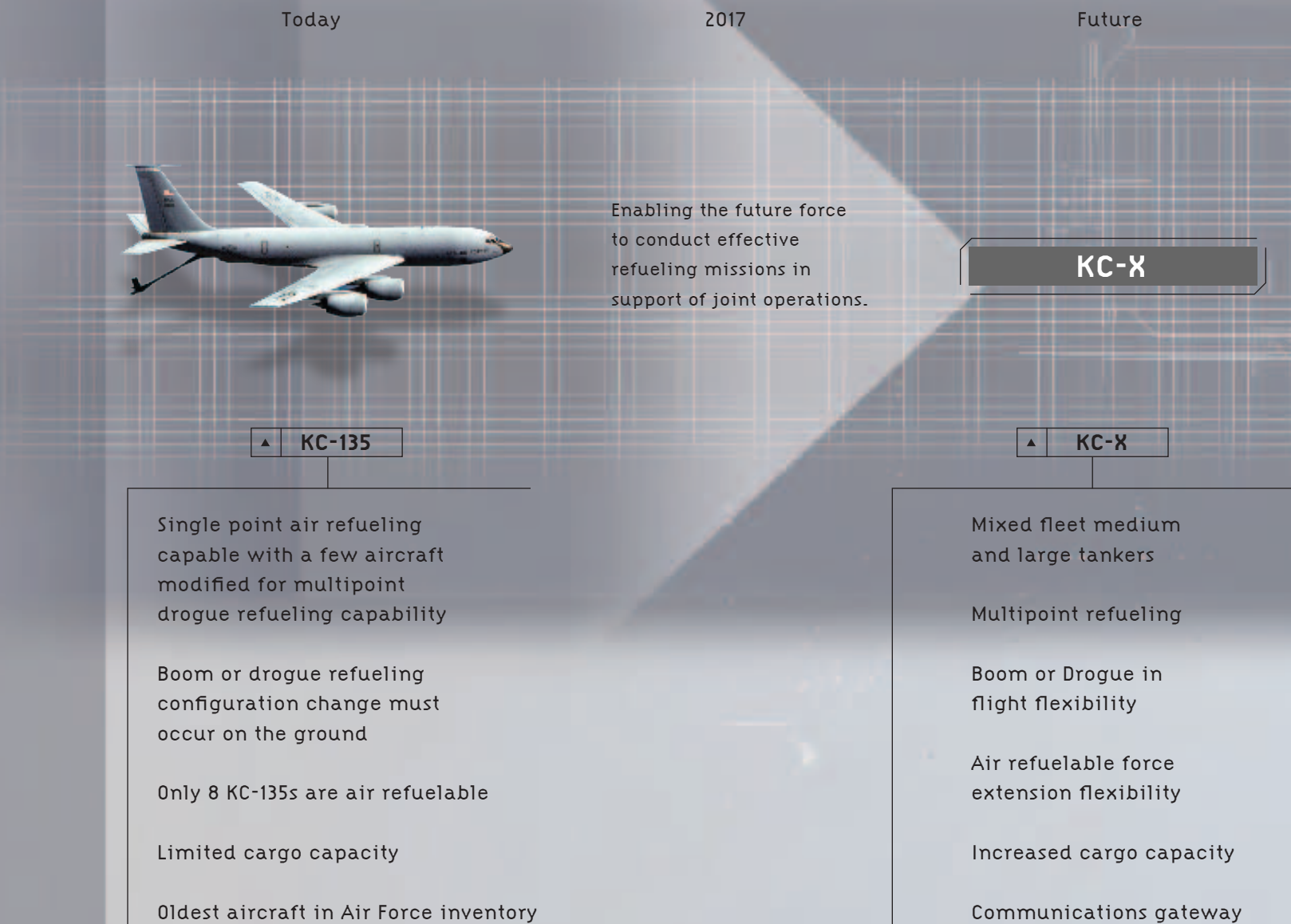
As an around the clock asset during periods of conflict, the Air Force is reviewing provisions for a “smart” tanker. This would enable the aircraft to act as a communications gateway or GIG relay node, for all forces. As these aircraft enter the inventory, they will complement the existing fleet until such a time as the numbers enable legacy fleets to retire.

# Air Refueling Force Structure



\* Initial funding provided within the future years defense program

## Air Refueling Modernization



Spacelift delivers satellites, payloads, and materiel to space. Assured access to space is a key element of United States national space policy and a foundation upon which United States national security, civil, and commercial space activities depend. The Air Force is the DoD Service responsible for operating space launch facilities. The Air Force provides robust and responsive launch operations to support time-sensitive military operations and will strive to develop capabilities to reposition, recover, and service assets on orbit.

### **Evolved Expendable Launch Vehicle (EELV)**

The EELV is the Air Force spacelift modernization program. EELV improves our nation's access to space by making space launch vehicles more affordable and reliable. The program replaces the existing fleet of launch systems with two families of launch vehicles, each using common components and common infrastructure. The vehicles are the Boeing Delta IV and the Lockheed Martin Atlas V. Each family has three variants, providing modularity to accommodate medium, intermediate, and heavy payloads. EELV's operability improvements over the legacy systems include a standard payload interface, standardized launch pads, increased off-pad processing, and support for routine launch operations.

The Air Force will sustain the EELVs and will explore launch systems with the potential of providing one or more orders of magnitude reductions in costs to enhance space access and responsiveness. In addition, it will sustain and modernize the Launch and Test Ranges into the far-term. The Air Force will ensure vital space capabilities are available to the warfighter by pursuing transformational capabilities such as: providing payloads ready to launch on demand, transferring them to necessary orbits, and servicing on-orbit spacecraft for life extension.

### **Operationally Responsive Space (ORS)**

Operationally Responsive Space (ORS) is an initiative to make affordable launch vehicles, launch ranges and payloads capable of launch in hours/days versus months/years in support of Combatant Commanders who can task them based on specific needs. These new systems will provide surge, augmentation, and limited reconstitution capability and be complimentary to existing national and theater capabilities. The ORS concept includes several elements. First, it requires a launch capability that is less expensive to deploy and faster to employ. Second, the cost of the payloads must be reduced to allow planners to tolerate risk taking. Payloads will be designed to one or two years versus ten. Finally, data translation rates will have to increase so operational commanders can take full advantage of the capabilities.

### **Launch Operations**

Launch Operations includes transporting assets to, through, and from space, and on-orbit servicing and recovery. The Launch and Test Range System and its complexes (Cape Canaveral AFS with the Eastern Range and Vandenberg AFB with the Western Range) handle the routine launch needs of all users. However, they lack the capabilities to handle launch "surges," responsiveness to accommodate rapid launches and delays, and sufficient communications link coverage. The Responsive Launch Traffic Control System will broaden the region over which the launch and test ranges are able to execute Telemetry, Tracking, and Commanding during spacelift operations as well as test and evaluation activities.



**Advanced technology and  
effective spacelift capabilities**

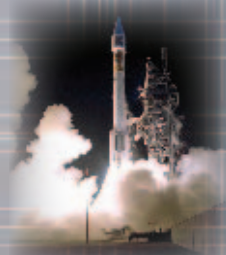
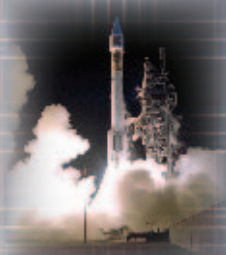
# Spacelift Force Structure

2006

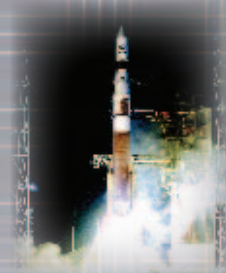
2017

2025

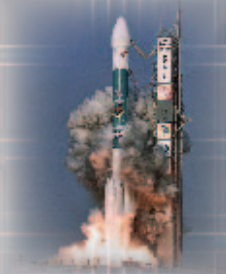
Atlas 5 ▶



Delta 4 ▶



Delta 2 ▶



ORS ▶

ORS

ORS



## Providing powerful precise effects rapidly

Precision engagement is the ability to apply discriminate, lethal or non-lethal force precisely where required – the ability to command, control, and employ forces to cause specific strategic, operational, or tactical effects

Current Air Force operations emphasize the powerful advantage of being able to create precise effects rapidly. The Air Force offers tremendous capabilities to meet this requirement, from pinpoint humanitarian responses to precise weaponry.

The Air Force has made significant progress in its efforts to develop and field a new generation of weapons that can attack and destroy pin-point, hardened, and relocatable targets at night and in most weather conditions while greatly reducing risk. Attention is also being focused on enhancing Air Force ability to engage moving targets.

Precision capabilities allow the joint force to engage in operations with dramatically reduced risk to friendly forces, significantly less costs in personnel and materiel, smaller forward-deployed footprint, and greater likelihood of success. The strike side of precision engagement enables the Air Force to employ minimum resources per target to achieve desired effects with the least collateral damage and enables a greater number of targets to be struck per sortie.


The Air Force is also developing means to achieving effects without having to destroy the target. At present, the usual option to affect a target is to destroy it with a kinetic weapon.

In the future the Air Force will conduct more precise operations to create effects short of total destruction and achieve intended consequences. Such a capability is critical in the post-Cold War operations that do not involve traditional conventional warfare; such as urban, stability, and peace operations.


These types of irregular operations often require capabilities that can deliver timely desired effects while minimizing collateral damage to infrastructure and people. Tailoring effects is also critical to disable weapons of mass destruction without catastrophic collateral damage. Future directed energy systems promise to provide a range of lethal and non-lethal effects from surgical strike to personnel denial without injury.

## Precision Engagement: Munitions

# Munitions



Advanced weapons will continue to be critical to the Air Force's ability to apply precision engagement capability when called upon. Air-to-ground and air-to-air weaponry act in concert to provide a lethal advantage in ground operations support and air dominance. Air-to-ground weapons, such as the Joint Air-to-Surface Standoff Missile — Extended Range (JASSM-ER), Joint Direct Attack Munition (JDAM), and Small Diameter Bomb (SDB), will not only provide superb precision and devastating effectiveness, but also provide aircrews the increased safety of additional standoff distance. Future iterations of the SDB will incorporate technology to track and destroy moving targets. Air-to-air weapons, such as the Air Intercept Missile (AIM)-9X and Advanced Medium-Range Air-to-Air Missile (AMRAAM), combine long-range shoot down capability with unparalleled weapon maneuverability and countermeasure defeating techniques.



It is beyond the scope of this document to address all munitions currently in the Air Force inventory or projected to enter service within the planning period. However, inventory weapons, e.g., general purpose gravity munitions, cluster bomb units, etc., will be supported by enabling technologies that provide the warfighter with a vast array of tools for use in almost any operational environment. Advanced fuzing technology will provide forces the flexibility to use a single weapon for varied targets, including those deeply buried in layered hideouts. Composite warhead casings and specially formulated energetics can provide tailored weapon effects, low collateral damage, and safer (insensitive) munitions. Another enabling technology, the Universal Armament Interface, will allow for faster and cheaper weapons integration by standardizing and simplifying weapon-to-aircraft interfaces and by decoupling weapons upgrades from the rigid schedule of pre-planned aircraft operational flight program updates.

Future weapons will employ sophisticated target identification algorithms and efficient propulsion, allowing autonomous munitions to persistently search wide areas for threats. These capabilities are complemented today by the procurement of sophisticated advanced targeting pods for legacy fighter and bomber platforms. Weapons will house destructive mechanisms specifically designed to defeat tomorrow's emerging threats, including chemical, biological, and radiological agents. Emerging directed energy technology will provide lethal and non-lethal means to disrupt electronics, protect friendly forces, and engage threats with scaleable effects. The Air Force arsenal will eventually communicate within the GIG with space, air, and ground forces, as well as other weaponry — supplying United States and allied forces with a robust and devastating advantage over opponents.

# Precision Engagement: Air-to-Ground Munitions

## JASSM-ER

The Joint Air-to-Surface Standoff Missile — Extended Range (JASSM-ER) is a precision, low observable, cruise missile designed for launch from outside area defenses to kill hard, medium-hardened, soft and area type targets. The weapon is capable of attacking both fixed and relocatable targets at ranges well beyond enemy air defenses.

## SDB

SDB is a 250 lb-class weapon and is designed as a small autonomous, conventional, air-to-ground, precision munition able to strike fixed and stationary relocatable targets from a standoff range. Dense inert metal explosive technology is being explored for use in the SDB to minimize collateral damage, particularly in urban environments. The SDB weapon system consists of the weapon; a 4-place common carriage system; mission planning system; and accuracy support infrastructure. SDB provides increased load-out and kills per sortie on current and future weapons systems.

## JDAM

The JDAM is a guidance tail kit that converts existing unguided free-fall bombs into accurate, adverse weather “smart” munitions. With the addition of a new tail section that contains an inertial navigational system and a global positioning system guidance control unit, JDAM improves the accuracy of unguided, general purpose bombs in any weather condition.

## HARM

The High Speed Anti-radiation Missile (HARM) is an air-to-surface tactical missile designed to seek and destroy enemy radar-equipped air defense systems. The AGM-88 can detect, attack and destroy a target with minimum aircrew input. Future variants will be upgraded to quickly geo-locate mobile surface-to-air missile threats to support time critical targeting.

## HSSW

The High-Speed/Hypersonic Standoff Weapon (HSSW) is a concept which will provide a standoff, rapid response capability against time sensitive targets in a limited “all weather” environment. Using a multi-aspect guidance system and an advanced propulsion system for high speed and long range, the weapon will be compatible with legacy and modern global attack platforms.

# Air-to-Ground Munitions Force Structure

	2006	2017	2025
GBU			
CBU			
JDAM			
HARM			
JASSM			
SDB1/2			
HSSW			



# Precision Engagement: Air-to-Air Munitions

# Air-to-Air

## AIM-7

The AIM-7 Sparrow is a radar-guided, air-to-air missile with a high-explosive warhead. The versatile Sparrow has all-weather, all-altitude operational capability and can attack high-performance aircraft and missiles from any direction. The AIM-7 series is a semiactive, air-to-air, boost-glide missile, designed to be either rail or ejection launched. Semiactive, continuous wave, homing radar, and hydraulically operated control surfaces direct and stabilize the missile on a proportional navigational course to the target. Propulsion for the missile is provided by a solid propellant rocket motor. The AIM-7 will be gradually phased out of the inventory over the planning period.

## AIM-9X

The AIM-9X Sidewinder is a short-range, IR-seeking, fire-and-forget missile. Advanced avionics and targeting allow the missile to be fired from large, off-boresight angles for close-in kills. It also provides resistance to countermeasures. The propulsion section incorporates a jet-vane steering system for enhanced post-launch agility. The X model is also compatible with the Joint Helmet-Mounted Cueing System, which is designed for ease of target acquisition and decreased aircrew workload.

## AMRAAM

The Advanced Medium Range Air-to-Air Missile is an all-weather, beyond-visual-range capability missile. The missile has improved capabilities against low-altitude targets. It incorporates active radar, which makes the missile less dependent upon the fire-control system of the aircraft. This enables the pilot to aim and fire several missiles simultaneously at multiple targets. The pilot may then perform evasive maneuvers while the missiles guide themselves to their targets. Carriage platforms include F-22A, F-35A, and legacy aircraft.

## JDRADM

The Joint Dual Role Air Dominance Missile (JDRADM) is under study as a single missile for air-to-air and air-to-ground employment. It is envisioned to address evolving threats, increase loadout flexibility, and increase standoff range and lethality. Primary target set will be fixed wing, rotary wing, cruise missile, and Suppression of Enemy Air Defense targets. The JDRADM will use a multi-spectral seeker and advanced propulsion techniques. Carriage platforms include F-22A, F-35A, and selected legacy aircraft.

# Air-to-Air Weapons Force Structure

2006

2017

2025

AIM-7 ▶



AIM-9M/X ▶



AIM-9X  
Block III ▶



AIM-9X  
Block IV ▶



AMRAAM C ▶



AMRAAM D ▶



AMRAAM D+ ▶



JDRADM ▶



# Specialized Air Power

## Key to irregular operations and the War on Terror

Air Force Special Operations Command (AFSOC) and Air Combat Command provide America's specialized airpower. AFSOC provides special operations forces and Air Combat Command provides combat search and rescue forces for worldwide deployment and assignment to regional unified commands. Key to Air Force contributions to irregular operations and the War on Terror, AFSOC forces can be grouped into special operations strike, ISR/Information Operations, and mobility capabilities.

# Special Operations Forces (SOF)

## Strike

The SOF strike primary missions are close air support, air interdiction, force protection, and the covert insertion of highly trained special operations forces. Missions in close air support are troops in contact, convoy escort and urban operations.

Air interdiction missions are conducted with AC-130 Gunships against preplanned targets or targets of opportunity. The AC-130 will operate into 2025, but will be augmented and eventually replaced with the Next Generation Gunship (NGG) beginning around 2020.

## ISR/Information Operations

SOF enables ISR and Information Operations by providing the airborne dissemination portion of a joint SOF solution in denied areas. SOF will continue to provide airborne psychological operations (PSYOP) broadcast with EC-130J Commando Solo aircraft, or an alternate platform.

The special mission equipment (SME) onboard these aircraft will be more powerful, more reliable, and more capable than the current SME, and may have the ability to broadcast on media unknown today.

The EC-130J is a recent acquisition to modernize the PSYOP arm of SOF well past 2025.

After 2025, the Air Force plans to transition the airborne PSYOP broadcast mission to a new platform, or mix of platforms. These might include satellites, Remotely Piloted Aircraft (RPA), near-space balloons, or a service-common platform. Most AFSOC aircraft have the ability to perform an ISR function.

## Mobility

MC-130 Talon (I and II) /Combat Shadow, MH-53 PaveLow, and the soon to be operational CV-22, provide infiltration, exfiltration, and resupply of special operations forces and their equipment into hostile or denied territory. These highly technical aircraft can be ready to respond to global hot spots, transporting highly trained SOF troops of the Army, Navy, and Combat Control Teams of the Air Force.

These effective and lethal troops can be transported direct from CONUS with air refueling support or from a forward operating location, clandestinely inserted, and exfiltrated without detection.

The MC-130 is an aging aircraft. Though no program is in place, the desire is to replace it with an improved state-of-the-art infiltration, exfiltration platform. In the meantime, the Air Force plans to replace the older Combat Talon I and Combat Shadow models with improved MC-130Js.

## Unmanned Systems

Spanning strike and ISR mission areas, unmanned systems continue to transform the battlespace. Operations ENDURING FREEDOM and IRAQI FREEDOM solidified how RPAs could be used in conjunction with manned aircraft and also directly support troops engaged in combat on the ground.

By 2020, technology will have completely transformed the battlespace allowing air campaigns to effectively and seamlessly integrate manned and unmanned systems as one instrument of power. AFSOC's initial development includes the focus of RPAs by mission area versus type of system. AFSOC's approach is for a family of systems to provide a flexible response for a variety of mission areas.

AFSOC intends to adjust its unmanned systems focus into several areas which include the legacy MQ-1, the follow-on MQ-9 and other systems. AFSOC will leverage system assets in this focus area and maximize systems, which have multiple roles including ISR, communications, direct combat and other mission areas.

Some future missions will benefit from having a human presence, but for many missions, the unmanned aircraft will provide far superior capabilities. Future RPAs may be able to provide close air support (CAS) in threat environments that will be unsurvivable for AC-130 gunships.

## Special Operations Forces: Strike

**Survivable, responsive, persistent,  
and precise fire support to joint,  
allied, and coalition conventional  
and special operations forces**

### AC-130H/U

The AC-130H/U Gunship is a heavily modified C-130 aircraft armed with side-firing weapons ranging from a 25MM gatling gun and 40MM cannon, to a 105MM howitzer. Its lethality comes from sophisticated sensors, navigation and fire control systems, all integrated into these weapons to provide surgical firepower or area saturation during extended loiter periods, at night and in adverse weather.

It provides a precision engagement capability that is survivable, responsive, and persistent to joint, allied, and coalition conventional and special operations forces in the low – to selected high-threat environment of the modern battlefield. Over the next 25 years there will be a proliferation of infrared, radar-guided, electro-optical, and directed energy threats rendering many of the current AC-130 defensive systems ineffective. The Air Force is programming immediate, off-the-shelf systems and emerging technologies to enhance the survivability and effectiveness of the AC-130s; and is developing options for an NGG.

### Next Generation Gunship

The NGG will be an integrated system of-systems incorporating survivable vehicle, organic sensor, air-launched RPA, and transformational lethal and less-than-lethal weapons technologies. Though there is no current funding for this program, the process is underway.

It must possess capabilities that are well beyond those of the current AC-130 fleet in order to be effective and survivable in the future. It must be able to operate during the daylight and be effective in close, dangerous settings such as urban environments.

As directed energy weapons (lasers and high-powered microwaves) become available, AFSOC will analyze them as potential options to enhance the AC-130 and NGG weapons suites. The challenge is to put the pieces together – integrate lethality; connectivity, situational awareness, and target identification; survivability; and persistence to achieve the right effect, at the right place, at the right time.

# SOF Strike Force Structure

2006

2017

2025

AC-130 ▶



NGG ▶

NGG

## SOF Strike Modernization

Today

2017

Future



▲ AC-130H/U

AC-130H & U  
Average age 22 years

Vulnerable to threats in  
the future battlespace

Must engage enemy  
in an unpressurized  
environment; lower  
altitude increases  
vulnerability

Costly to operate

Enabling the future force  
with persistent, precise CAS  
– urban and danger close Air  
Interdiction – Destruction  
of enemy convoys / Lines  
of Communications

NGG

▲ NGG

Variable lethal and  
non-lethal effects

Improved sensors  
and weapons

RPA collaboration

Armed Reconnaissance  
– Partner with RPAs  
for action on time  
sensitive targets

Force protection during  
stability operations

## Special Operations Forces: ISR/Information Operations

### EC-130J

The EC-130J Commando Solo is a specially-modified four-engine Hercules transport, which conducts information operations, psychological operations and civil affairs broadcasts in AM, FM, HF, TV and military communications bands. A typical mission consists of a single-ship orbit offset from the desired target audience – either military or civilian personnel. Many modifications have been made to Commando Solo. These include enhanced navigation systems, self-protection equipment, air refueling, and the capability of broadcasting radio and color TV on all worldwide standards.

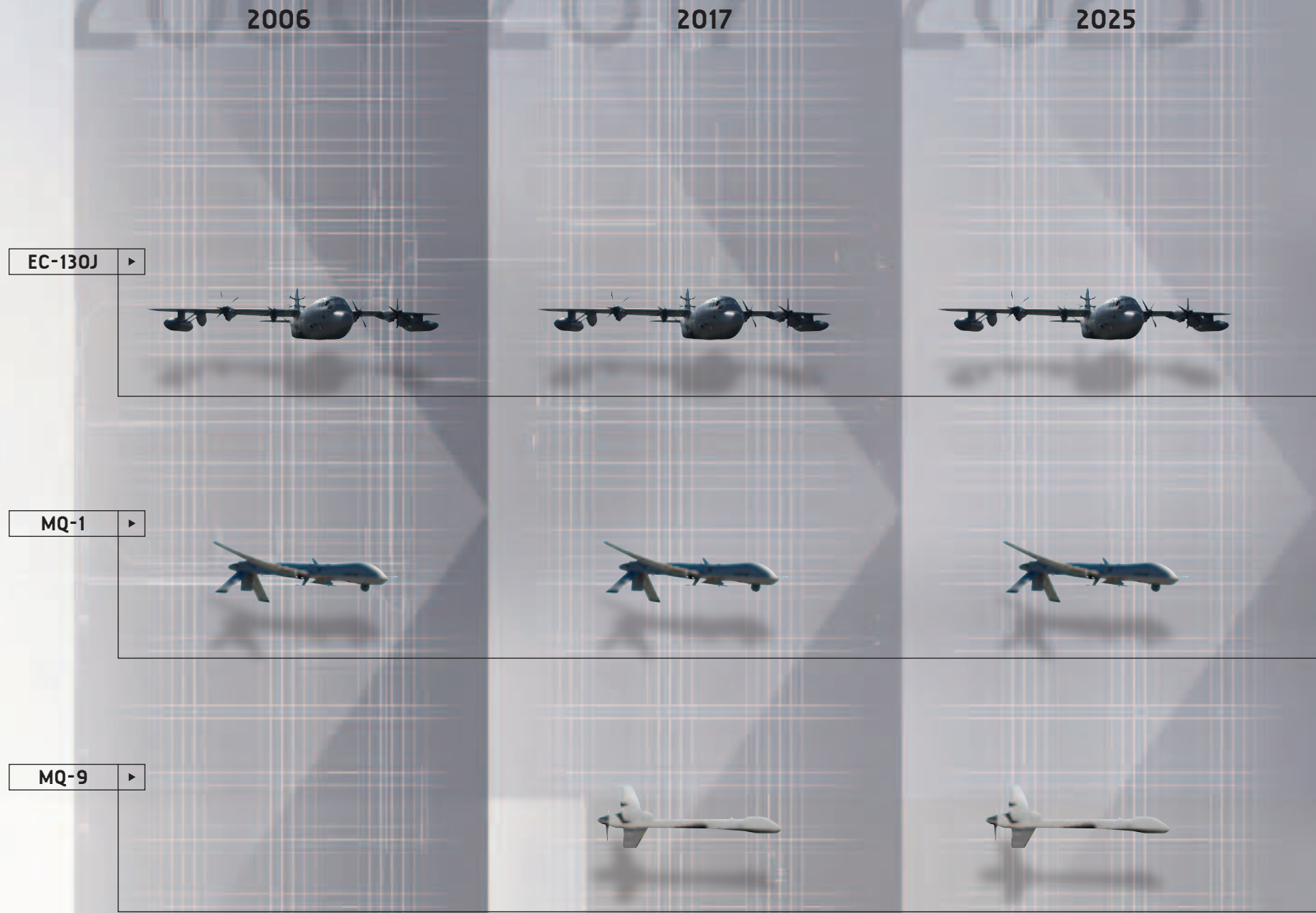
### MQ-1

MQ-1 Predator is a medium-altitude, long-endurance, remotely piloted aircraft. The primary mission is interdiction and conducting armed reconnaissance against critical, perishable targets. When the Predator is not actively pursuing its primary mission, it acts as the Joint Forces Air Component Commander-owned theater asset for reconnaissance, surveillance and target acquisition in support of the Joint Forces commander. Predator is a system, not just an aircraft. A fully operational system consists of four aircraft (with sensors), a ground control station, a Predator Primary Satellite Link, and approximately 55 personnel for deployed 24-hour operations.

### MQ-9

The MQ-9 Predator is a scaled-up derivative of the MQ-1 Predator. The primary mission equipment consists of a multi-spectral targeting system, sensor turret/laser designator and a synthetic aperture radar. In the future, the MQ-9 Predator can also be used as an armed multi-mission RPA, launching AGM-114C/K Hellfire missiles and other guided weapons.

# SOF ISR/Information Operations Force Structure



# Special Operations Forces: Mobility

## MC-130P

The MC-130P Combat Shadow flies clandestine or low visibility, single or multi-ship low-level missions intruding politically sensitive or hostile territory to provide air refueling for special operations helicopters. The MC-130P primarily flies missions at night to reduce probability of visual acquisition and intercept by airborne threats. Secondary mission capabilities include airdrop of leaflets, small special operations teams, bundles and combat rubber raiding craft. As MC-130Js become available, they are planned to replace the MC-130Ps.

## MC-130E/H

The MC-130E/H Talon (I and II) provides infiltration, exfiltration and resupply of special operations forces in hostile or denied territory. Its secondary missions include psychological operations and helicopter air refueling. An extensive electronic warfare suite enables the aircrew to detect and avoid potential threats. If engaged, the system will protect the aircraft from both radar and infrared-guided threats. As MC-130Js become available, they are planned to replace the MC-130Es.

## Joint Cargo Aircraft

The JCA will be a light, multi-mission aircraft that can fit into various AFSOC missions. This small, intra-theater airlift aircraft, may serve as a clandestine delivery system for cargo/special forces in blackout mode, into austere unimproved locations. JCA may also serve as a general-purpose resupply platform for operations near or behind the frontline. Additionally, the JCA may have the ability to be modified as an air refueling tanker for helicopters.

## MH-53

The MH-53 Pave Low's mission is low-level, long-range, undetected penetration into denied areas, day or night, in adverse weather, for infiltration, exfiltration and resupply of special operations forces. Versions of the MH-53 Pave Low heavy-lift helicopter are the largest, most powerful and technologically advanced helicopter in the Air Force inventory. The terrain-following and terrain-avoidance radar, forward-looking infrared sensor, inertial navigation system with global positioning system, along with a projected map display enable the crew to follow terrain contours and avoid obstacles, making low-level penetration possible.

Additionally, the advanced systems enhance its present defensive capabilities providing instant access to the total battlefield situation, through near real-time Electronic Order of Battle updates.

As the MH-53 phases out, the CV-22 will provide infiltration, exfiltration and resupply of special operations forces and their equipment into hostile or denied territory. Drawdown completion of the MH-53 is slated for FY12; however, efforts are underway to retire all aircraft by 2011.

## CV-22

The CV-22, Osprey is a tilt-rotor, vertical/short takeoff and landing, multi-mission aircraft. Its primary mission is low-level, long-range, undetected penetration into denied areas, day or night, in adverse weather, for infiltration, exfiltration, and resupply of special operations forces. Its terrain-following, terrain-avoidance radar and forward-looking infrared sensor, along with a projected map display, enable the crew to follow terrain contours and avoid obstacles, making low-level penetration possible.

Active and passive defensive countermeasures increase the survivability of the aircraft. The Osprey can rapidly deploy and can carry 18 combat troops. Battle damage tolerance is built into the aircraft by means of composite construction and redundant and separated flight control, electrical, and hydraulic systems. It will be equipped with the Directional Infrared Countermeasures system, which works with other onboard self-protection systems to enhance the aircraft's survivability against infrared guided missiles.

# SOF Mobility Force Structure

2006

2017

2025

MH-53



CV-22



MC-130E/H/J\*



MC-130H/J



MC-130P



MC-130P/J



JCA



JCA\*\*

JCA

JCA

\* Initial funding for MC-130Js planned within the future years defense program

\*\* Initial funding provided within the future years defense program

## SOF Mobility Modernization

Today

2017

Future



Enabling the future force to conduct self-deployable with enhanced speed, range & survivability.

MH-53

CV-22

Old, costly to operate

Vulnerable now, less survivable in the future

Slow speed and limited range

Limited payload

Fully fielded by FY-17

Direct Action – Infiltration / Exfiltration / Resupply of SOF teams

Aerial Refueling / Forward Arming and Refueling Point – Combat mission enabler

# Air Combat Command provides Combat Search and Rescue — a core Air Force mission

## Combat Search and Rescue

Air Combat Command is responsible for organizing, training, and equipping CSAR forces for worldwide deployment in support of Combatant Commanders. Combat Search and Rescue forces also provide worldwide support of humanitarian and disaster relief operations in support of United States national security interests and domestic civil support. The forces consist of two primary platforms: HH-60, HC-130.

# Search & Rescue



# Combat Search & Rescue

## HC-130

HC-130P/N is an extended range, combat search and rescue version of the C-130 Hercules transport. HC-130P/Ns primarily fly at night to reduce the probability of visual acquisition and intercept by airborne and ground threats. The primary mission is to extend the range of recovery force helicopters through aerial refueling of CSAR helicopters.

Extended visual and electronic searches over land or water, tactical airborne radar approaches, and unimproved airfield operations are included in its capability.

Ongoing modifications have added an integrated global positioning system navigation package, radar and missile warning receivers, chaff and flare dispensers, airborne integrated satellite communications radios, and cockpit armor.

Selected aircraft are equipped with night vision goggle compatible interior and exterior lighting, improved low-power color radar and forward-looking infrared systems.

## CRT-X

The Combat Rescue Tanker (CRT-X) is an advanced tanker aircraft set to augment then replace the current fleet of fixed wing rescue tankers that are used in the combat search and rescue mission. The CRT-X will provide Personnel Recovery/Recovery Operations forces with increased range by conducting in-flight and ground refueling of vertical lift assets to include (but not limited to) the HH-60, CV-22 and next generation (CSAR-X) rescue platform. CRT-X will have the capability to provide overt/covert airland or airdrop delivery of rescue forces and their equipment. In addition, and when prudent, the CRT-X will have the capability to perform the Airborne Mission Commander mission, as well as extended visual/electronic searches and unimproved airfield operations for survivor medical evacuation.

## HH-60

The primary mission of the HH-60G Pave Hawk helicopter is to conduct day or night operations into hostile environments to recover downed aircrew or other isolated personnel. Because of its versatility, the HH-60G is also tasked to perform military operations other than war. These tasks include civil search and rescue, emergency aeromedical evacuation, disaster relief, international aid, counterdrug activities and space shuttle support.

## CSAR-X

The Combat Search and Rescue Vehicle Replacement Program (CSAR-X) will provide Personnel Recovery (PR) forces with a medium-lift vertical take-off and landing aircraft that is quickly deployable and capable of main base and austere location operations for worldwide PR missions.

The CSAR-X will be capable of operating in all environmental regions of the globe day or night during adverse weather conditions. It will be capable of passing through Chemical, Biological, and Nuclear environments.

On-board defensive capabilities will permit the CSAR-X to operate in an increased threat environment. The aircraft will be self-supporting to the maximum extent practical and range extended with inflight refueling. The aircraft will have hoist and alternate insertion/ extraction capability. Procurement deliveries for the CSAR-X are planned to begin in FY10.

CSAR Force Structure

2006

2017

2025

HH-60 ▶



CSAR-X ▶

CSAR-X

CSAR-X

HC-130 ▶



CRT-X ▶

CRT-X

CRT-X

CSAR Modernization

Today

2017

Future



▲ HH-60

Too much mission for too few aircraft; limited by range, speed, cabin space, weather penetration, and self-defense



▲ HC-130

Reduced range, offload, and speed, costly to operate, aging rapidly, older systems, less survivable in the future

CSAR-X

Faster, greater range, increased payload, all weather penetration, improved covert operations with state-of-the-art defensive systems

CRT-X

Greater range, increased reliability, better communications, enhanced defensive systems, and improved penetration capability

## Create, protect and sustain

Agile Combat Support (ACS) is the Air Force's distinctive capability to create, protect and sustain Air and Space Forces across the full range of military operations. It is the foundational and crosscutting Air Force system of support that enables Air Force Operational Concepts and the capabilities that distinguish air and space power – speed, flexibility, and global perspective. The ACS concept of support is inclusive of strategic and operational level sustaining functions, in-garrison and steady state operations, as well as Expeditionary Combat Support that delivers ACS capabilities to COCOMs.

Agile Combat Support is much more than just “logistics.” The ACS family incorporates 26 functional capabilities. The 26 functional capabilities range from the Chaplain Service to Aircraft Maintenance. All of these capabilities are needed to create, protect and sustain forces across the Range of Military Operations.

Because ACS covers the entire spectrum of combat support for the Air Force, the following section highlights only a few ACS future vectors described using three ACS master processes: Readyng the Force, Sustaining the Force and Employing the Force.

# Capabilities to Effects

The 26 functional capabilities are fused together in various contextual combinations to create eight Master Capabilities. The Master Capabilities are used by the six Master Processes to produce six Master Effects for the warfighter. ACS makes no distinction between peacetime and wartime processes; the effects promote and defend United States national interests at any time or place.

Functional Capabilites		Master Capabilities		Master Processes		Master Effects			
<div>Support</div>	Acquisition		Create Forces		Readying the Force		A Readied Force		
	Airfield Management		ACS Command and Control		Preparing the Battlespace		A Prepared Battlespace		
	Air Traffic Control								
	Chaplain Service		Establish Operating Locations		Positioning the Force		A Positioned Force		
	Civil Engineer								
	Communications / Information		Posture Responsive Forces		Employing the Force		An Employed Force		
	Contracting								
	Education		Protect Forces		Sustaining the Force		A Sustained Force		
	Financial Management and Comptroller								
	Health Services		Generate the Mission		Recovering the Force		A Recovered Force		
	Historian								
	Judge Advocate		Support the Mission, Forces and Infrastructure						
	Logistics Readiness								
	Maintenance		Sustain the Mission, Forces and Infrastructure						
	Manpower								
	Munitions								
	Office of Special Investigations								
	Personnel								
	Postal								
	Public Affairs								
	Safety								
	Science and Technology								
	Security Forces								
	Services								
	Training								
	Test & Evaluation								

## Readying the Force

U.S. forces must be able to respond to any operational requirement, ranging from regional/global crises and increases in tension/humanitarian support, to major theater wars. This ability relies upon the basic U.S. Code, Title 10 (Service Responsibilities) to organize, train, and equip. ACS fulfills these responsibilities by ensuring that the capabilities and resources necessary to maintain readiness are available, and in the required state of preparedness. Undergraduate Flying Training is just one example how ACS readies the force.

The Air Force has a proud tradition of producing the world's most proficient pilots. As such, undergraduate flying training produces approximately 1,500 pilots and 550 combat systems operators per year for the Air Force, Air National Guard, Air Force Reserve Command, sister services, and foreign countries. This process is instrumental in the development of advanced combat crew and survival training for the joint rated force.

The Air Force intends to replace the service-life extended, yet aging T-1A's and T-38 fleets after the current Future Years Defense Program (FYDP) once there is sufficient time to evaluate the service life of these key systems. The T-38 will undergo engine, avionics, brakes and escape system upgrades. The Air Force plans to retire the T-43 by FY12 and the T-37 by FY09. Although a T-1 replacement is not reflected as of 2025, the Air Force may procure a commercial variant between 2018 and 2030, depending on the T-1 evaluation programmed for the FY17 timeframe. There are new challenges with the UH-1H helicopter training mission taken from the Army in 2006, and the growth of remotely piloted aircraft operator training.

# Flight Training

# Undergraduate Flying Training Force Structure

	2006	2017	2025
T-1A ▶			
T-6A ▶			
T-37B ▶			
T-38 ▶			
T-43 ▶			
T-38 Replacement ▶		<div>T-38 Replacement</div>	<div>T-38 Replacement</div>



# Sustaining the Force

As a core component of ACS, sustainment must be highly mobile, technologically superior, robust, responsive, flexible, and fully integrated with combat operations. It includes improving the quality of life for deployed personnel as well as the steady-state employment of combat operational forces. It is the long-term mastery of an environment (peacetime and contingency) that requires constant and consistent support, and includes both materiel and personnel resources. Science and Technology (S&T), Agile Sustainment and its enabling concepts, along with Health Services will be examined to show how ACS delivers its enabling effects.

## Science and Technology

The Air Force is committed to providing the nation with the advanced air and space technologies required to protect national security interests and ensure the Air Force remains on the cutting edge of system performance, flexibility, and affordability. Air Force S&T investments are focused on achieving the warfighting capabilities required by the Air Force Concepts of Operations. Among the future technologies currently being explored by the Air Force that will likely significantly impact future force structure are:

### Directed Energy

The Air Force is investing significant resources in directed energy technology, to include lasers and high powered microwaves. Directed energy weapons will allow truly surgical precision, including a variety of non-lethal effects. Additionally, directed energy will support missions such as missile defense, information operations, and force protection.

### Hypersonics

Experimentation with hypersonic technology will enable next generation rockets, missiles, and aircraft to operate at speeds above Mach 5. Hypersonics will enable the prosecution of time sensitive targets in support of global strike and rapid mobility on a global scale. Furthermore, this technology will greatly enhance space access with greatly expanded launch windows, rapid orbital rendezvous, and decreased gross lift-off weight.

### Nanotechnology

The Air Force is addressing scientific barriers to miniaturization of components at the nanometer scale. Nanotechnology innovations will yield structures, materials, and devices that have controllable features on the nanometer scale. Nanotechnology will support the development of ultra-small sensors, power sources, and enable revolutions in electronics and computing.

### Advanced Energetics

The Air Force is exploring advanced energetics for explosives and propulsion. This research will enable future generations of munitions that are safer to handle and deliver more explosive and controlled effects than today's weapons. In addition, new liquid and solid propellants will revolutionize space launch, satellite propulsion, and aircraft persistence.

# Sustaining the Force

## Agile Sustainment

Agile Sustainment is the ability to provide materiel, facilities, services and other support to maintain readiness and enable operations until successful accomplishment of the defined mission or national objective. Product support is the continuous and collaborative set of activities that establish and maintain readiness and operational capability of a system, subsystem, or major end item throughout its life cycle; it is the overarching activity that bridges acquisition and sustainment phases. Depot maintenance and supply are key elements of product support.

## Sustainability

The Air Force depot maintenance strategy calls for major transformation in financial and infrastructure capitalization. To support this plan, the Air Force increased investment in plant, equipment, processes and personnel to modernize our depot maintenance operations. Weapon system managers are charged with establishing their product support and depot maintenance strategies early in the system life cycle, as well as planning the necessary investment dollars required for capacity and capability. Additionally, the Air Force is partnering with private industry to adopt technologies to meet capability requirements to enhance warfighter support.

## Deployability

Deployability, effectiveness, and sustainability of forces are directly dependent upon the combat support upon which they rest. In the environment of today and tomorrow, supporting the needs of the Joint Force Commander will require both flexibility and efficiency. Massive deployed inventories will be replaced by support reflecting what is needed, when it is needed -- agility and responsiveness will be the hallmarks of future support. The Air Force has already begun to pursue concepts supporting LEAN Logistics and intends to complement and extend these activities with approaches emerging from the Air Force and throughout industry.

## Responsiveness

Responsiveness will replace huge in-theater inventories. Time definite resupply and reliable 'reachback' to CONUS practices will be adopted. Many of these approaches can be made through the advances in information technology. ACS is the foundational concept of combat support for Air Force forces -- from CONUS based to disaster relief buildups to expeditionary combat operations.

## Depot Maintenance

A key element of Air Force sustainment is depot maintenance. The Source of Repair Assignment Process (SORAP) is the process by which the Air Force postures its depot level maintenance workloads. This analysis starts very early in the acquisition process -- prior to the Milestone B decision. The SORAP embodies the sustainment strategy reviewed by the Acquisition Strategy Panel.

The Depot Maintenance Master Plan identifies future weapon systems and equipment upgrades and lays out a timeline to establish organic depot repair capability for specific workloads. For example, the C-5 RERP and AMP will require depot activation in the FY08 through FY11 time frames. Depot activations include partnering discussions, which begin early in the acquisition process. Partnering is part of the sustainment strategy and is key to maximizing the capabilities of both the public and private sector.

Following this timeline will allow the Air Force to establish organic capability for specific workloads identified as core capability. Depot Activation, if required, is accomplished for each weapon system NLT four years after establishing IOC.

Depot Maintenance Transformation (DMT) is an Air Force initiative designed to improve depot production, processes, and practices to provide customers with responsive, predictable and affordable products and services. As a result, the Air Force will have consistent, standardized processes that increase throughputs, agility and responsiveness in the depot maintenance shops.

Building upon the foundation laid by the Depot Maintenance Reengineering and Transformation effort, Headquarters Air Force Materiel Command chartered a Business Process Reengineering team to integrate "LEAN" process improvement efforts on the shop floor with production support processes.

The future depot maintenance operation will be characterized by resources available at point of use and time of need. A professional, flexible workforce will be well trained and have a culture that thrives on continuous improvement. Visual controls and a single information system will standardize work. Facilities and equipment will be right-sized and state of the art. DMT will align responsibility, authority, and accountability and benefit from pro-active planning and scheduling of workload in anticipation of customer requirements. The goals are to achieve 100% On-Time Delivery and to reduce flowtime by 25%. The overarching transformation goals are to increase airframe availability by 20% and to have a 10% reduction in annual operating costs by 2011. Depot maintenance process improvement methods will improve affordability, provide reliable, predictable prices and improve data system efficiency. Production and production support will have a "LEAN" focus and each production line will implement the 6S (sort, straighten, scrub, standardize, safety, and sustain).

# Sustaining the Force

## Agile Sustainment – Enabling Concepts

ACS encompasses many key enabling concepts which sustain the force. Two such concepts are Operational Support (OS) and Expeditionary Logistics.

### Operational Support

The OS Modernization Program is the business modernization, process improvement, systems integration engine of the Air Force. It describes the Air Force approach to promote Air Force-wide OS modernization, manages OS processes and information technology investment from an integrated commander and airmen perspective, and creates the necessary governance structures and makes key decisions related to issues and priorities of enterprise-wide support modernization. The Operational Support Modernization Plan not only looks at modernizing systems, but also transforms Air Force business processes, personnel skills and organizations. The Air Force OS transformation vision improves capabilities that provide rapid and predictive combat support and response through situationally aware commanders.

OS has two main goals: first, improve warfighter effectiveness by fashioning fast, flexible, agile and lethal combat forces; and second, achieve increased efficiencies that will allow OS to return resources toward recapitalization of Air Force weapon systems and infrastructure, return Airmen to core missions, and increase job satisfaction of the workforce.

The strategy to achieve these two goals has five components:

1. Focus OS on improving Joint Warfighter effectiveness
2. Set common goals and priorities across the OS enterprise
3. Re-engineer critical processes
4. Move systems into a modern information network
5. Harvest resources to complete OS transformation and support modernization of Air Force and joint capabilities

### Expeditionary Logistics

Expeditionary Logistics for the 21st Century (eLog21) is the Air Force transformation campaign plan to improve logistics warfighting capabilities to meet both the current and future threat environment. eLog21 is action focused, and is a strategy that guides key logistics transformation initiatives to realize expeditionary logistics. Two goals are being used to drive and measure the effort: 20% increase in equipment availability; reduce annual O&S costs by 10% (\$2.75B) by FY11. The initiative takes advantage of best practices both internal to the Air Force and from the private sector.

eLog21 will achieve four effects. First, the plan will establish an enterprise view to ensure that logistics decisions are made and actions taken with the understanding of their impact across the Air Force. It requires end-to-end business processes enabled by integrated technology, and supported by well-trained professionals that execute to a common Air Force objective across the enterprise.

The second effect is integrated processes. This is the drive toward total efficiency and effectiveness in the expeditionary logistics enterprise. With integrated end-to-end businesses processes, orders can move from the flight line to the source of supply in minutes rather than days; parts can be directed and redirected to the most urgent need with near real-time visibility, and planning is integrated with execution which will help close the feedback loop.

Third, to support integrated processes, human, financial, acquisition and infrastructure resources will be optimized across the enterprise. These optimized resources will ensure training, financial resources and other systems are augmented and re-engineered as needed to support the transformation objective.

Finally, integrated technology tools must be employed. The goal is to automate business processes, provide process visibility, and establish total transparency across all systems. This new capability is the key to establishing an integrated, network-centric infrastructure.

# Sustaining the Force

## Health Services

The education and training, experience, and physical and cognitive abilities of every Airman make each unique and fundamentally irreplaceable. Each individual is intrinsically valuable to the function of the Air Force as a whole. The Air Force Medical Service (AFMS) is dedicated to optimizing the potential of each individual. To do so, the AFMS promotes human performance sustainment and enhancement technologies, provides preventive health maintenance and ensures appropriate treatment/therapy for any health and performance deficits whether physical or mental.

The AFMS partners with individuals to accomplish healthcare maintenance activities. The AFMS works with commanders and weapon systems designers to optimize the interface between personnel and machines. AFMS expertise is integral for force protection, sustainment and mobility operations. In addition, the AFMS identifies, evaluates, designs, and recommends controls to health hazards to prevent illness and injuries. If prevention fails, the AFMS will rapidly restore each Airman to a combat ready status or arrange for the appropriate rehabilitative services.

**Air Force Medical Service Fundamental Belief:**  
**Airmen are the most valuable Air Force resource.**

## Health Services Effects for the Warfighter

**Ensure a fit and healthy force.** Defines the characteristics of a fit and healthy war fighting force and maintains these standards through prevention and treatment.

**Prevent casualties.** Preventive medicine activities, based on a view of total health risk, required to achieve the ultimate goal of ensuring the force is available for all phases of directed missions.

**Restore health.** The combined processes utilized to recover an individual from an illness and/or injured condition to duty as quickly as possible.

**Enhance human performance.** Provide medical, psychological, and physiological interventions, operational analyses, technology consultation, adjuncts and augmentations, and advocacy for research and development to enhance human performance in all operational environments.

# Health Services Science & Technology Modernization

The following figures represent timelines for health services modernization and development in the areas of Science & Technology, Home Station Infrastructure & Force Development, and Expeditionary Platforms:

2006

2017

2025

Transition demonstrated technologies to operational use, e.g., Tele-Health, Theater Medical Information Program, Composite Health Care System II

Develop new technical solutions to support required future capabilities

Transition capabilities-based priorities into robust modernization programs

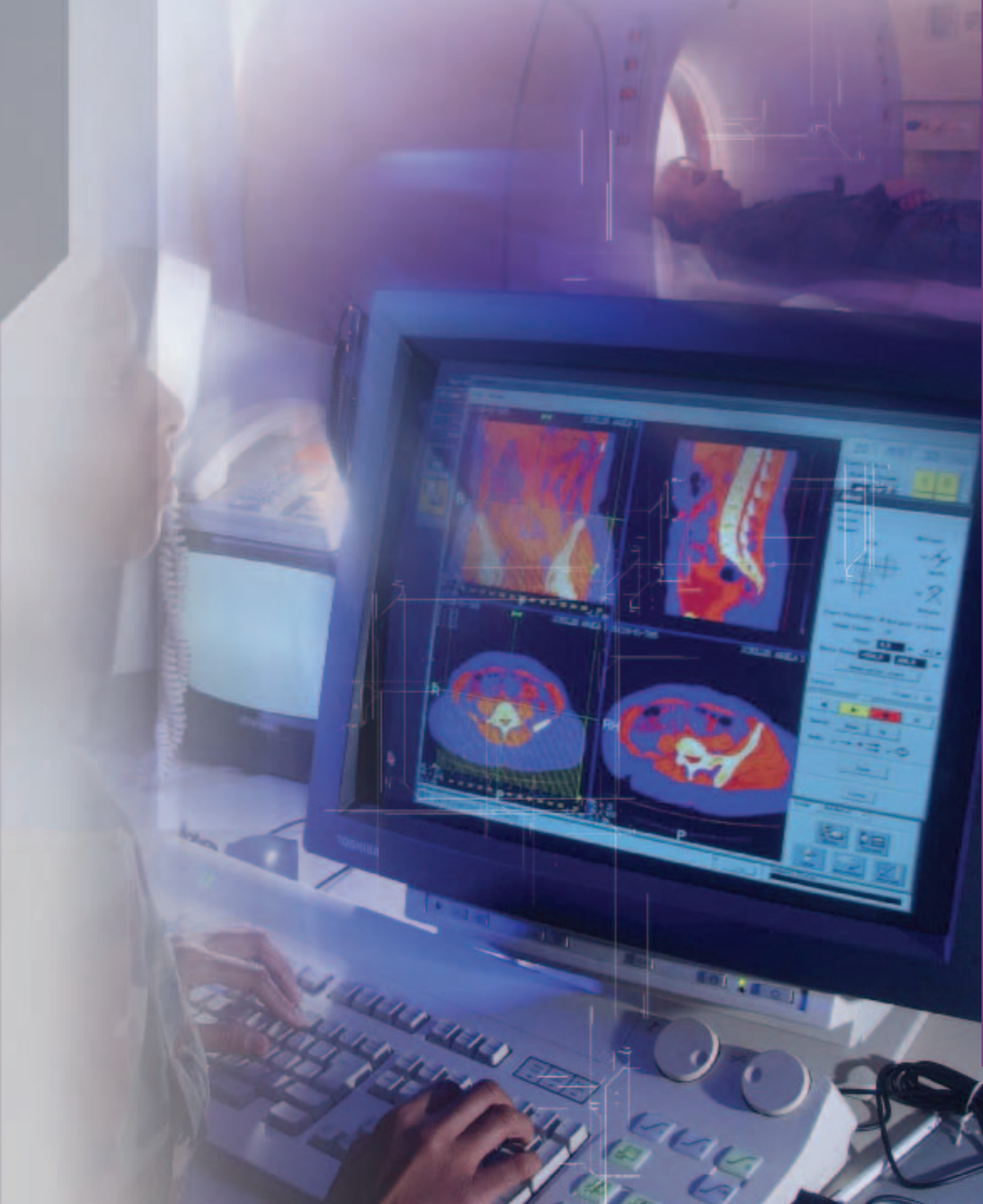
Integrate modernization processes into capabilities-based Planning, Programming, Budgeting Execution System

Transition capabilities-based new medical technologies to the AFMS that enhance Air Force medical capabilities (e.g., the “Medical Scancorder”)

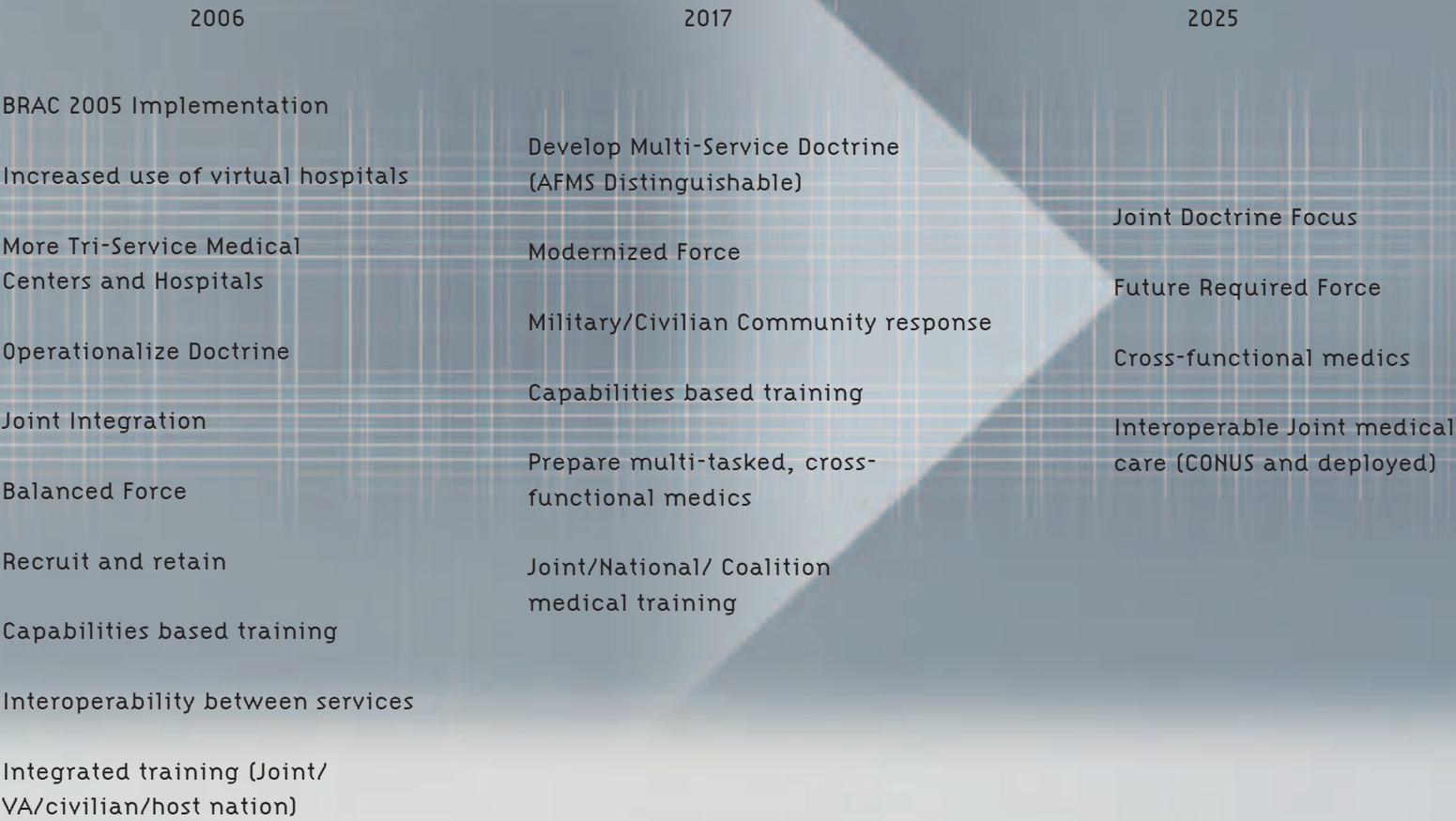
Transition new technologies that enhance warfighter performance

Integrate AFMS Medical Modernization into a Joint Capabilities based process

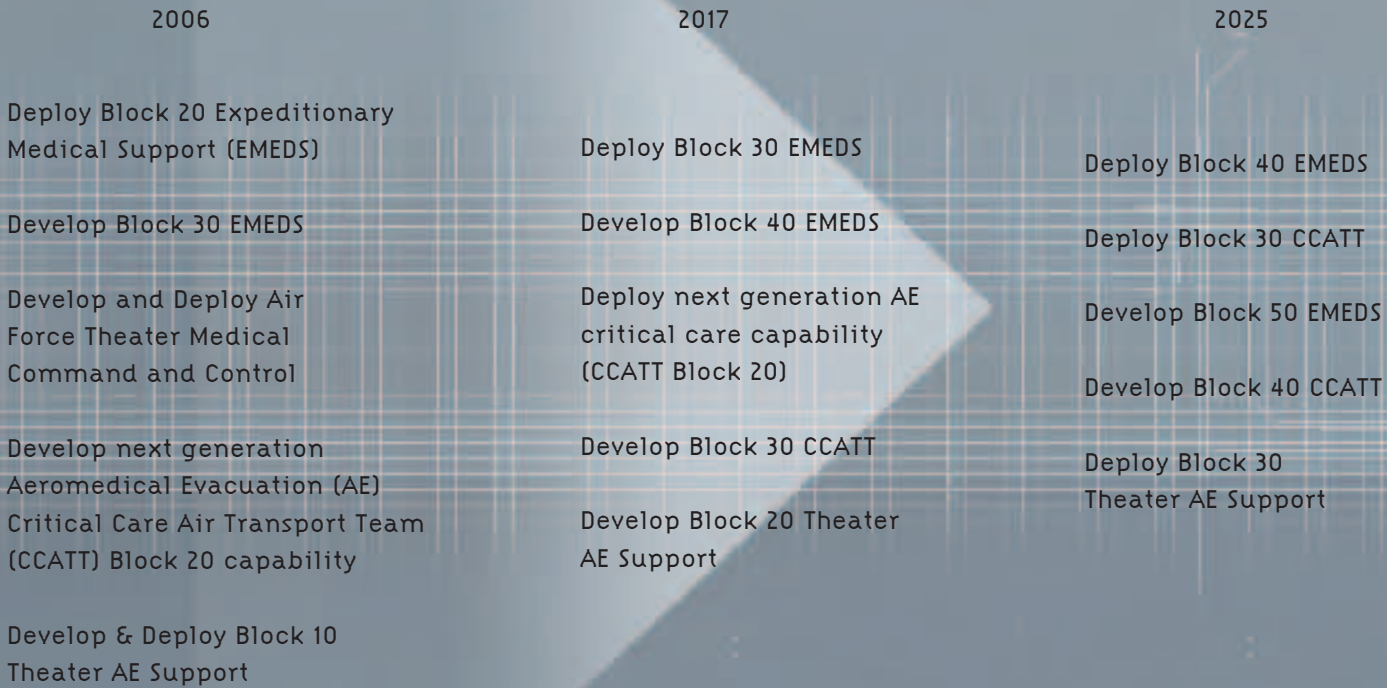
Optimize capabilities and quickly transition new technologies and practices that enhance human system performance, provide fit and healthy force and (real time or on time) meet Air Force mission needs



Health Services Home Station Infrastructure & Force Development Modernization



Health Service Expeditionary Platforms Modernization



# Sustaining the Force

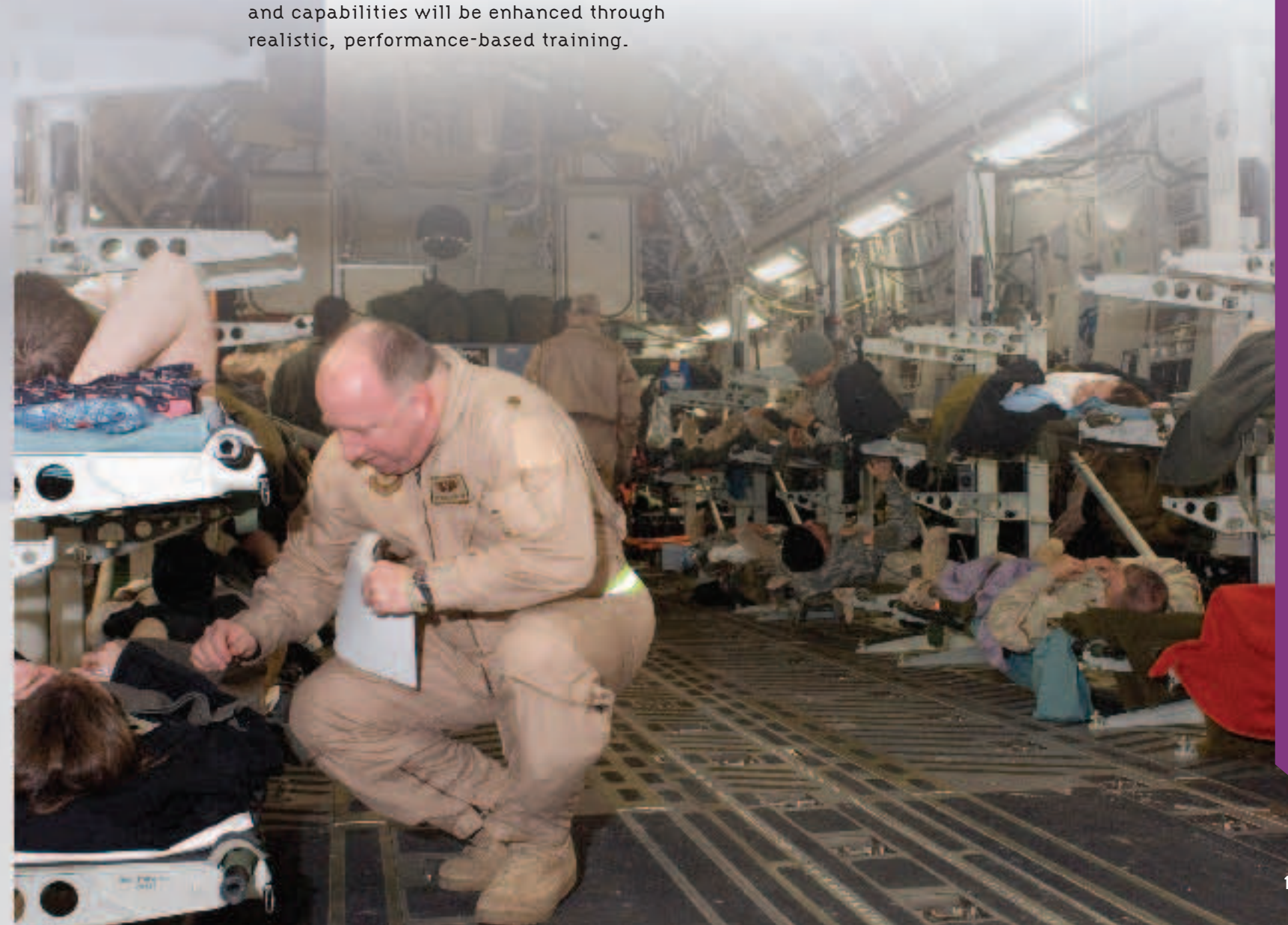
## Air Force Medical Service 2025

Health Services will remain crucial to creating the force through support to recruiting, training, and retaining a healthy and fit force.

Health services will continue to protect the force through small, highly capable, Expeditionary Force Health Protection and optimized local, theater and global healthcare systems. A robust AE system and associated support enable transfer of patients from forward resuscitative care out of theater to definitive care. And finally, health services, fully integrated with C4ISR capabilities will enhance the common operating picture for combatant commanders worldwide.

To sustain the force, Health services supports human system integration and performance enhancement to maximize operational effectiveness. Increased joint and coalition medical operations interoperability and leveraging of sister service, Veterans Affairs, and civilian healthcare/medical platforms and education systems are central to continuous focused, capabilities-based medical modernization. AFMS will partner with Civilian/Military Healthcare/Veterans Affairs systems to support healthcare delivery and capabilities will be enhanced through realistic, performance-based training.

As the Air Force Medical Service moves toward 2025, medical experts will support Air & Space Expeditionary Force and joint requirements (e.g., AE, Special Operations Forces, Homeland Security, etc.) to include prevention, primary care, human-systems integration, Chemical, Biological, Radiological, Nuclear, and High Yield Explosives/directed energy human health effects, and trauma/critical care with a balanced future medical force... all deployable.



# Employing the Force

## Integrated Defense

Integrated base defense (IBD) is defined as the integrated application of offensive and defensive actions, both active and passive, taken across the ground dimension of the force protection (FP) battlespace to achieve local and area dominance.

Security Forces is the Air Force enterprise leader for IBD. There is also resident within this capability a synergistic FP effort comprised of myriad functional specialties, including Civil Engineers, Communications and Information, Transportation, Supply, Medical Services, Intelligence and Office of Special Investigations.



Security Forces is leading the way in making IBD a reality by expanding the current level of force protection efforts and increasing the operational battlespace to better protect Air Force and Joint resources. As seen in Operation IRAQI FREEDOM, the Air Force was and will be responsible for detecting, assessing, denying and responding to threats across and throughout the base security zone. Detecting threats outside the airbase perimeter requires improved initial combat skills training, additional threat detection training, tactics and procedures, state-of-the-art technology and equipment (i.e., robotics and IBD security systems) and associated tactical C4ISR systems.

# Employing the Force

## Security Forces Transformation

Air Force Security Forces (SF) must transform to fully support current and future air and space operations. SF will transform from the current installation focus to an expeditionary-based combat capability to provide effective IBD – to go outside the wire and get their arms around the threats to airfields and facilities. To achieve this objective, the Air Force and SF must change the way it organizes, trains, and equips for deployment. SF will adopt a “warfighter first” ethos.

Toward this goal, SF transformation effort requires two mission competencies – Security Operations and Air Provost. First, SF must be proficient in Security Operations to provide active and defensive measures to protect, defend and fight an air base. Next, they should remain current in Air Provost tasks to provide law and order in an expeditionary environment. This transformation must include a total force approach including SF military and civilians in the active and reserve components.

## Expeditionary Airmen: Key to Integrated Defense

Expeditionary Airmen (EA) are all Airmen, officers and enlisted, Active, Air National Guard and Air Force Reserve. EA generally perform their duties within the base perimeter. But the current and future battle space is replete with evolving asymmetric threats and no defined front line. EA require a basic set of expeditionary combat skills to survive, whether at home base or deployed.

The Air Force transformation to an Expeditionary Air Force was the first step to ensuring an efficient and effective force to meet the challenges of a changing security environment. The next step is ensuring each and every Airman possesses the requisite combat skills to defend airbases. SF have the lead, but can not go it alone. In order to accomplish this full AEF transformation, a culture change is required. This new “warrior culture” will be codified in the Airmen’s professional development process. It will permeate the entire life cycle of an Airman: from recruitment and indoctrination through training courses and Professional Military Education, with sustained and expeditionary readiness as Airmen develop into leadership positions.



## Summary


Within projected funding limits, the Air Force Roadmap represents the best, moderate risk combination of capabilities to maximize effectiveness of air and space power across the range of military operations required in the future security environment. The force structure presented in this roadmap creates the distinctive capabilities that allow the Air Force to provide global vigilance, reach, and power to joint force commanders every day. It is a smaller, yet significantly more capable force than is currently fielded today. It is grounded in national strategic guidance and envisions a total team of Active, Guard, and Reserve Airmen fighting as an integral part of a joint force in an uncertain environment across the spectrum of conflict from irregular to traditional. It will assure our allies and dissuade, deter, and defeat our foes.

In the future, the Air Force will continue to shift investment from traditional combat forces with single mission capabilities to multi-role forces, and aggressively divest itself of legacy systems. This smaller but more capable force will provide for modernization and recapitalization of selected weapon systems, allowing the Air Force to commit more resources to networked and integrated joint enablers.


Overall, this modified force structure increases support to the joint warfighter. With more airlift and aerial refueling capability; more capable space constellations; persistent air-breathing ISR; and new ways to think about close air support, the future Air Force will provide more of the capabilities demanded by the joint force.

While there is a degree of uncertainty associated with planning 20 years into the future, such an effort charts a course, which allows all affected parties to work towards a common goal. But uncertainty does exist, not only in the strategic environment, but in the fiscal environment as well.

If the fiscal environment were to change in a manner that allowed increased procurement, the Air Force would seek to reduce risk by increasing capabilities and capacity in key areas. To mitigate the effects of decreasing relative capability vis-à-vis potential adversaries and increasing operating cost, the Air Force would augment the recapitalization of the fighter force. To more effectively and efficiently enable air power throughout the range of military operations, capacity would be enhanced in the rapid global mobility capabilities with synergies possible across the spectrum of assigned missions, to include special operations. Such investments would reduce risk, increase flexibility, and bolster effectiveness in irregular operations and the War on Terror, while ensuring a decisive deterrent and operational advantage in traditional forms of conflict.



**A smaller, but significantly  
more capable force**



**This force structure will not only revolutionize traditional, high-intensity combat operations, but also help enable the United States to face new irregular, potentially catastrophic, and disruptive challenges.**

The force structure detailed in this Roadmap will also enable the ongoing transformation of the Air Force. This transformation will improve the ability of the Joint Force Commander to achieve decision cycle dominance and strike adversaries before they can mount an effective defense. This force structure will be able to penetrate and defeat the next generation of advanced air defense systems to sustain air superiority into the foreseeable future and significantly improve combat air support to ground forces. It will protect space systems and, if necessary, deny space to adversaries. These increased capabilities will use smaller forces to disable an adversary rather than having to destroy it with mass attrition, and provide both kinetic and non-kinetic options to achieve desired effects.

This force structure will not only revolutionize traditional, high-intensity combat operations, but also help enable the United States to face new irregular, potentially catastrophic, and disruptive challenges in the post-Cold War security environment. Rapid global attack, information superiority, rapid global mobility capabilities and special operations are essential in the ongoing global war on terrorism. Rapid global attack, rapid global mobility, persistent C4ISR, precision engagement, information superiority, and stealthy air defense penetration capabilities will counter various anti-access and area-denial strategies used by our adversaries.

Information superiority, precision engagement, special operations, agile combat support, and rapid global mobility capabilities will greatly enhance counter insurgency operations, urban operations, peace operations, and stability operations. Predictive battlespace awareness and force protection; will greatly improve the ability to detect, pre-empt, and defend United States forces and the United States homeland against attacks. The result will be a force structure with expanded capability to combat irregular, catastrophic, and disruptive threats, while maintaining the capability to combat traditional threats.

